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BOOK

(3)

THE WORLD

Maurice J. Moore

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LONGMANS' GEOGRAPHICAL SERIES

BOOK III.

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PREFACE TO 1921 EDITION

THIS Edition contains all the improvements and additions that were made in the 1912 Edition, and it has been brought up to date both as regards subject matter and maps in accordance with the terms of the Peace Treaty. Each new State has been treated separately. In some cases new maps are given and new boundaries are shown as far as they have been definitely settled.

PREFACE TO FIRST EDITION

THIS new Series of Geographies consists of five books, the first three of which have been arranged upon the concentric system both as regards matter and maps.

The first book gives a brief sketch of the chief geographical features of the globe. The second book traverses the same ground, but supplies greater detail. The third book goes still further into detail.

Hence, in studying the first book the pupil learns the most important facts and uses them as centres about which the additional facts in the second and third books are naturally grouped.

The maps have been constructed upon the same principle, and in each book they contain only such names as are mentioned in the text. The maps are so complete that no atlas will be needed for use with these books.

Particular attention has been paid to industrial and commercial geography, and throughout the series special stress is laid upon the close connection between the position, physical configuration, and products of a country with the employments of its people.

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LONGMANS' GEOGRAPHICAL SERIES

BOOK III

INTRODUCTION

1. **GEOGRAPHY**, as its name implies, describes the earth on which we live. It may be divided into four branches—Mathematical, Physical, Political, and Commercial.

Mathematical Geography treats of the earth as a planet, its shape and size, its motions and their results, latitude and longitude, and the methods by which its surface may be represented on globes and maps.

Physical Geography treats of the natural features of the earth's surface, such as the distribution of land and water, and the conformation of its crust; of its atmosphere and climate; of its minerals, plants, and animals; and of the causes which bring about changes on its surface.

Political Geography treats of the various countries into which the surface of the earth is divided, their political and social institutions, and the occupations and condition of the people inhabiting those countries.

Commercial Geography treats of the exchange of commodities, the locality and manner of their production, the modes of transport, and the routes by which they are carried.

MATHEMATICAL GEOGRAPHY

2. **THE EARTH AS A PLANET**.—In very early times astronomers noticed that, while the vast majority of the stars seemed to maintain their relative position unchanged from year to year, five appeared to change their position in the heavens

with regard to the other stars. These five on this account were called **planets**, while the others were termed **fixed stars**. After a while it was discovered that these planets moved round the sun as a centre; then the discovery was made that our earth was also a planet, moving round the sun in a similar manner to the other five; now we know that numbers of other heavenly bodies, some larger and some smaller than the earth, also revolve round the sun at varying distances and in different times, forming with the sun what is called the **Solar System**.

The path described by one body in its revolution round another is called its **orbit**. The orbits of the planets are not quite circular, but slightly elliptical, the sun occupying one of the foci. It therefore follows that a planet is not always at the same distance from the sun. When nearest the sun the planet is said to be in *perihelion*, and when at the point of its orbit which is most distant from the sun in *aphelion*.

3. The Solar System consists of—

(a) The sun, situated near the centre.

The sun, around which the earth travels at an average distance of nearly 93 millions of miles, is one of the multitude of fixed stars. It appears larger and brighter to us, because it is so much nearer than the other stars. It is an intensely hot body, shining by its own light; while most of the planets and their satellites are cool bodies, and do not, therefore, give out light of their own. Compared with the earth, the sun is a globe of enormous dimensions; its **diameter** being 866,500 miles—that is, nearly 110 times the diameter of the earth; while to make up its **bulk** about 1,300,000 bodies as large as the earth would be required.

When viewed through a telescope, **dark spots** may often be seen upon its brilliant surface. If one of these spots be carefully noticed, and observed again after a few days, it will be found to have moved farther towards the western side of the sun's disc, where it finally disappears. After an interval it reappears on the eastern side, and arrives at the position where it was first noticed in about twenty-five days, furnishing us with a proof that the sun **rotates** on its axis in that time.

(b) **Eight large planets.** These, arranged according to their distance from the sun, are: **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.**

Each of these planets except Mercury and Venus is attended by one or more satellites, which revolve round it, and accompany it in its revolution round the sun.

The following table shows the number of moons, distances from the sun, and diameters of the primary planets:—

Planet	Moons	Distance from the sun in millions of miles	Diameter in miles
Mercury . . .	—	36	3,080
Venus . . .	—	67.2	7,700
Earth . . .	1	92.9	7,918
Mars . . .	2	141.5	4,220
Jupiter . . .	4	483.5	86,000
Saturn . . .	8	886.5	71,000
Uranus . . .	4	1,782	31,800
Neptune . . .	1	2,792	34,500

Fig. 1 shows the order and time of revolution of the planets. The distances are not to scale, Neptune being really about eighty times as distant from the sun as Mercury.

(c) A number of smaller planets, termed **planetoids** or **asteroids**, revolving between the orbits of Jupiter and Mars.

(d) **Comets**.—These are bodies usually moving in an elongated

FIG. 1.—THE SOLAR SYSTEM.



orbit, at one time very near and at the other an immense distance from the sun. They vary much in appearance, but generally consist of a more or less bright **head**, followed by a train of dimmer light called the **tail**.

Some comets have a regular period of revolution, and move round the sun in an elongated elliptical orbit. Others move in a curve like a parabola, and after passing round the sun vanish into space.

(e) **Meteors.**—These are small bodies travelling round the sun like comets, with which they possibly have some connection. Under the term are included **shooting-stars**, **fire-balls**, and **aërolites**.

When one of these bodies in the course of its revolution strikes our atmosphere, the friction caused by its rapid motion generates so much heat that it burns, and we see it as a streak of light.

4. THE SHAPE OF THE EARTH. Owing to the action of certain well-known laws, the earth is not a perfect sphere. Careful measurements show that it is slightly flattened at the poles and slightly bulging at the Equator. Such a figure is termed an **oblate spheroid**. The following points, among others, are adduced as reasons for concluding that the earth is spherical in shape.

1. When a ship is approaching the shore, the first parts to be seen are the top-sails; as she nears the land the lower sails and rigging come into sight, and lastly the hull appears. If the earth's surface were flat, the hull, being the largest part, would be visible first. The look-out in the crow's nest sees the whale spouting before it can be seen by the men on deck, because he looks over the curved surface which intercepts their view. If two vessels

FIG. 2.—DIAGRAM TO ILLUSTRATE THE ROUNDNESS OF THE EARTH.



approach each other (fig. 2), the observer at A sees only the portion above the line A B, while the look-out at C sees all above the line C D.

These appearances are noticeable in all directions, objects of the same height coming into view at the same distance. This shows that the surface must be spherical, as, if round in one direction only, these distances would vary.

2. The shadow thrown by the earth on the moon in a lunar eclipse is *always* circular in shape, which could not be the case unless the earth were spherical in form.

3. The sun, moon, and the other heavenly bodies are globular in form, and therefore it is only natural to assume that the earth is also a globe.

4. Numbers of ships circumnavigate the globe every year, sailing eastward round Africa to Australia, and returning by Cape Horn to their starting-point. This could only be accomplished upon a body having a round surface.

5. The sun rises earlier for places east and later for places west. If the earth's surface were flat he would be visible at all places on the surface directly he appeared above the horizon.

6. The Pole Star is seen on the horizon at the Equator; as the observer goes north it gradually rises above his horizon at the rate of 1° for every 69 miles (approximately) traversed, until at the North Pole it appears directly overhead. This would not be the case on a plane.

5. THE SIZE OF THE EARTH.—By the aid of the stars the various dimensions of the earth have been accurately deter-

mined. In round numbers the **equatorial diameter** is 7,926 miles, while the **polar diameter** is 7,900 miles. The difference of $26\frac{1}{2}$ miles between the two diameters in so large a body is so slight, that for all practical purposes we may regard the earth as a globe. The earth's **circumference** at the Equator is 24,899 miles; and the **area of its surface** 197,000,000 sq. miles.

6. THE MOTIONS OF THE EARTH.—The earth has two motions—

(a) **Rotation**, the *daily (diurnal) turning* on a line which passes through its centre, and is called the **axis**.

(b) **Revolution**, the *yearly (annual) motion* round the sun.

The first motion, rotation, gives us the length of the day, and, by bringing the various parts of the earth's surface successively into sunlight, causes the alternate light and darkness which we term **day and night**.

The sun appears to rise in the east, pass across the sky, and disappear in the west every day. If certain stars be observed at night, they will be found to follow a similar course. These appearances must be due either to the fact that these bodies are moving round the earth, or that the earth turns on its axis. This latter fact has been accepted for several reasons, among which may be mentioned: the flattening of the earth at the poles, and the bulging at the Equator (due to a rotatory motion); the incredible velocity the heavenly bodies would possess in order that they might revolve round the earth in twenty-four hours; the improbability that larger bodies would revolve around smaller ones.

The term day is used in two senses: first, to denote the time of the earth's rotation on its axis, and, secondly, the time from sunrise to sunset.

The **time of the earth's rotation** is easily found by observing when a particular fixed star is exactly south, and then noting when the same star reappears in the same position. This time is found to be 23 hours 56 minutes 4 seconds, and is called a *sidereal day*. The ordinary day, which is measured from the sun, is 3 minutes 56 seconds longer than the time of the earth's rotation, and is called a *mean solar day*. Its greater length is due to the fact that, while the earth has been making a complete rotation, it has also been moving onwards in its orbit, and hence must continue to turn nearly four minutes longer, to bring any given place to the same position with regard to the sun as on the previous day.

7. The second motion, revolution, determines the length of the year. It takes the earth $365\frac{1}{4}$ days to make one revolution round the sun. This revolution is made with the *earth's axis inclined to the plane of its orbit at an angle of $66\frac{1}{2}^{\circ}$, and constantly pointing in the same direction*. This causes the variation in the length of day and night and the difference in the altitude of the sun at noon, and thus brings about the **change of seasons**.

The exact time taken by the earth to complete one revolution round the sun is 365 days 6 hours 9 minutes 9 seconds. This is called the *sidereal year*, because it is the time which the sun appears to take to go round from one fixed star and return to the same. The *tropical, or equinoctial, year* is the one used for ordinary purposes. Its length is 365 days 5 hours 48 minutes 46 seconds, and it is the time occupied by the sun in moving from one tropic or equinox back to the same again.

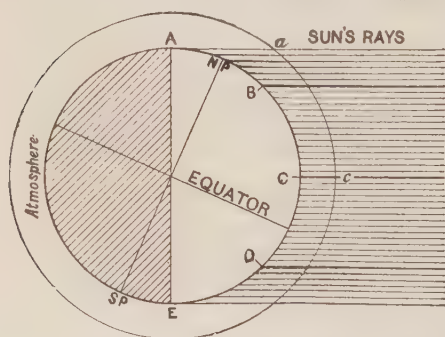
The reasons for concluding that the earth revolves round the sun are also drawn from observations of the heavenly bodies. If in the Northern Hemisphere we watch the rising of the sun from December 21 to June 21, he will be found to rise farther and farther north each day; while from June 21 to December 21 he appears to rise farther and farther south. Because this apparent motion stops at these dates, they are called the **Solstices**; June 21 being the **Summer Solstice**, while December 21 is the **Winter Solstice**. If the earth remained in the same position, the sun would rise and set in the same points each day.

Certain stars also, which are visible at one period of the year, pass out of sight and appear again after a year's interval in the same place, while other stars come into view and then disappear again in their turn.

These constant changes, which occur every year under exactly similar circumstances, tell us that the earth is continually changing its position in the heavens.

8. THE SEASONS.—As the earth flies on its journey round the sun, the direction at which the sun's rays strike any part

FIG. 3.—DIAGRAM TO ILLUSTRATE THE SEASONS.



of its surface undergoes constant change, and the amount of heat received at any particular place consequently varies. The relative effect of the sun's rays upon equal portions of the earth's surface may be seen from fig. 3. When the sun is higher in the heavens, its rays strike the ground more nearly perpendicular, and the amount of heat

received is greater, for the following reasons:—

(a) When the sun is higher, the number of rays falling upon any part of the earth's surface is greater than when it is lower. If A B, B C, C D, and D E represent equal parts of the earth's surface, it is evident that B C, where the sun's rays fall more perpendicularly, receives a much greater number of rays than A B, where the rays strike the surface in a more slanting direction.

(b) The rays pass through less atmosphere when the sun is higher, and consequently do not lose so much of their heat. The rays at A pass through the atmosphere for a much greater distance than those at C, A a being greater than c c.

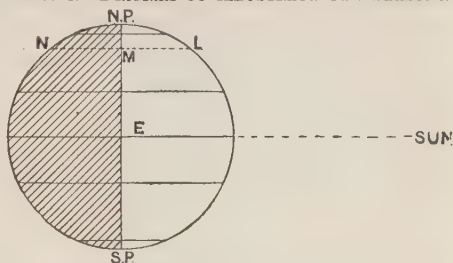
9. The cause of the change of seasons is best understood from a consideration of the following diagrams:—

If the earth's axis were perpendicular to the plane of its orbit, as in fig. 4, then it is evident that every place on its surface would have 12 hours day

and 12 hours night. The regions about the Equator would have, as now, the hottest climate (par. 8), while towards the poles it would grow gradually colder. There would be no difference in temperature at any given place throughout the year, and consequently none of the changes which we call seasons.

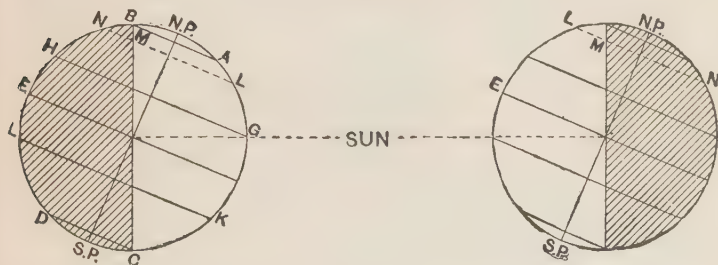
If we now incline the earth's axis to the plane of its orbit as in fig. 5, we get an explanation of the variation in the length of days and nights which brings these changes about. It will be seen that when the earth is in this position the sun's rays reach a considerable

FIG. 4.—DIAGRAM TO ILLUSTRATE THE SEASONS.



distance beyond the North Pole, and that, although the earth rotates on its axis, a considerable area around the North Pole (from A to B) remains continuously in the light, while a similar area around the South Pole (from C to D) does not receive any light from the sun. This is the position of the earth with regard to the sun at midsummer for the Northern Hemisphere, while for the Southern Hemisphere it would be midwinter. If in fig. 4 L marks the position of London, then it is clear that one rotation gives an equal length of day and night, LM being equal to MN; but in fig. 5 the point

FIG. 5.—DIAGRAM TO ILLUSTRATE THE SEASONS.



L would be in sunlight for a much greater part of the rotation, LM being now much greater than MN.

The distance beyond the North Pole at which the sun's rays strike the earth's surface is $23\frac{1}{2}^{\circ}$, and is determined by the inclination of the earth's axis to the plane of its orbit. This gives the position of what is called the **Arctic Circle**, while a similar distance from the South Pole marks the position of the **Antarctic Circle**.

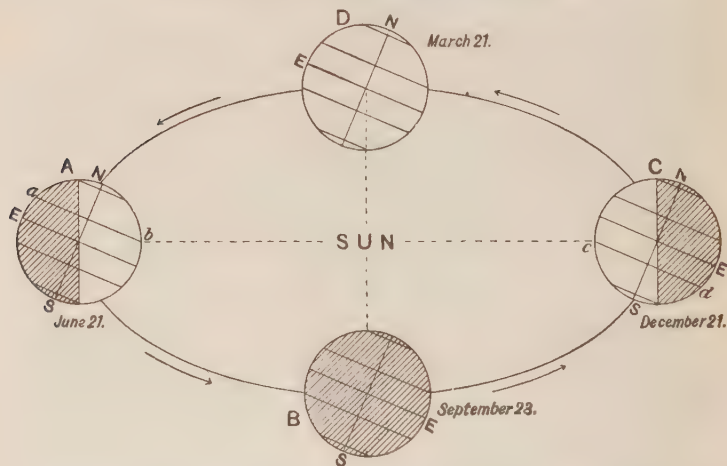
10. Fig. 6 shows the earth at four points of its orbit. At A, the earth's position at the *summer solstice* (June 21), the North Pole is turned towards the sun, which is now overhead at noon on a line $23\frac{1}{2}^{\circ}$ north of the Equator, called the **Tropic of Cancer**. This line is called a **tropic** because the sun appears to turn south after reaching it. The Northern Hemisphere is now in the midst of its summer, while the Southern Hemisphere is in the midst

of winter. Regions within the Arctic Circle have at least one day in the year during which the sun is above the horizon more than twenty-four hours, while within the Antarctic Circle the night is of corresponding length. At the poles the sun is visible for six months, and out of sight six months.

When the earth has accomplished half its annual journey and reached position c, the *winter solstice* (December 21), the conditions are reversed. The South Pole is turned towards the sun, which is now overhead at noon on a line $23\frac{1}{2}^{\circ}$ south of the Equator, called the **Tropic of Capricorn**, the Northern Hemisphere receives less heat and is having its winter, while the Southern Hemisphere is rejoicing in summer.

Midway between these positions the sun is exactly overhead at noon at the Equator, each hemisphere receives the same amount of sunlight, and

FIG. 6.—DIAGRAM TO ILLUSTRATE THE SEASONS.



days and nights are equal everywhere. These positions are on this account called the **Equinoxes**. B is the **Autumnal Equinox** (September 23), and D the **Vernal or Spring Equinox** (March 21).

11. THE ZONES.—It will be seen from the preceding paragraphs that the regions near the Equator, where the sun is overhead, are the hottest; those near the poles, which receive the sun's rays almost horizontally, are the coldest; while between these lie regions neither very hot nor very cold. These five divisions are called **zones**.

The Tropic of Cancer, $23\frac{1}{2}^{\circ}$ ($23^{\circ} 28'$ exactly) north of the Equator, is the northern limit at which the midday sun is seen overhead. The Tropic of Capricorn, $23\frac{1}{2}^{\circ}$ south of the Equator, is the southern limit. The sun is always overhead at some point within these boundaries; consequently, this belt is, on the whole, the hottest part of the earth, and on that account it is called the **Torrid Zone**.

The Arctic Circle, $23\frac{1}{2}^{\circ}$ from the North Pole, is the boundary of the **North Frigid Zone**, and the Antarctic Circle, $23\frac{1}{2}^{\circ}$ from the South Pole, is the boundary of the **South Frigid Zone**. Within these circles the sun does not rise more than $23\frac{1}{2}^{\circ}$ above the horizon in the height of summer, and consequently but little heat is received from his rays. As will be seen from fig. 7, while the regions in the North Frigid Zone are having their six months' continuous sunlight, those of the South Frigid Zone will be enveloped in darkness.

Between the Arctic Circle and the Tropic of Cancer lies the **North Temperate Zone**; while between the Antarctic Circle and the Tropic of Capricorn is the corresponding **South Temperate Zone**. In these two zones are to be found the most energetic and enterprising nations of the earth, the heat not being so great as to sap the energy of the inhabitants, nor the cold so intense as to prevent industrial pursuits being carried on throughout the year.

FIG. 7.—THE ZONES.



12. LATITUDE AND LONGITUDE.—By the latitude and longitude of a place we mean its exact position on the earth's surface. If a point be marked on a plain globe we are at once confronted with the difficulty of defining its exact situation, there being no fixed point from which its position may be stated.

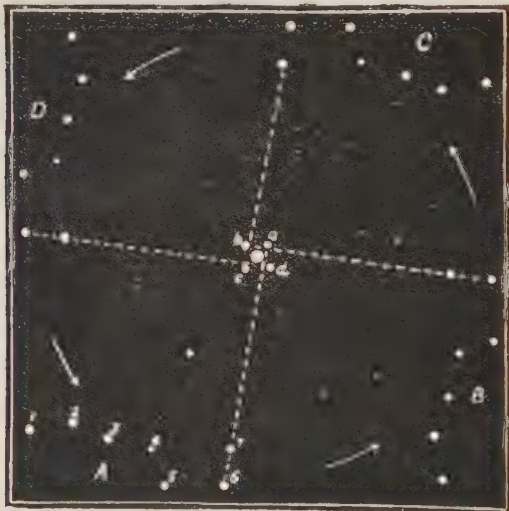
The rotation of the earth serves the useful purpose of giving us two fixed points from which distances may be measured. All the other parts of its surface are constantly changing their positions; but as the earth's axis is always inclined to the plane of its orbit at the same angle, its ends—the North and South Poles—are constant; and hence we can say that a place is a certain distance from either of the poles.

13. The points in the heavens directly over the poles of the earth are called the **Celestial Poles**. Near the Celestial North Pole is a bright star, called for that reason the **Pole Star**; and hence at night when we look at this star we are facing towards the North Pole of our earth. This star may be readily found by means of the constellation called the Great Bear. This group contains seven bright stars, arranged as shown in fig. 8. A line in the direction of the stars marked 6 and 7 points to the Pole Star.

The **compass** furnishes us with a more ready means of finding the north. The magnetic needle, when suspended freely, points nearly north and south. It does not point exactly to the North Pole, but to a spot called the **Magnetic Pole**. The variation at Greenwich is now $17\frac{1}{2}^{\circ}$ W.—that is to say, the needle at Greenwich points about $17\frac{1}{2}^{\circ}$ west of north.

14. Midway between the poles, as has already been shown, a line, called the **Equator**, is drawn round the globe, dividing it into two equal parts—the Northern and Southern Hemispheres. As it is more convenient to measure from one fixed point than from two, the Equator is used as the standard line from which all distances north or south of it may be measured. *The distance of any place north or south of the Equator is called the Latitude of that place.* To enable us to fix the position of a place north or south of the Equator more accurately, other circles are drawn

FIG. 8.—DIAGRAM TO ILLUSTRATE THE POSITION OF THE POLE STAR.



parallel to the Equator, and hence they are called **Parallels of Latitude**.

The Equator is called a **great circle** because it divides the earth into two equal parts. The parallels of latitude decrease in size as they approach the poles, and are called **small circles**.

For convenience in measurement every circle is supposed to be divided into 360 equal parts called **degrees** ($^{\circ}$). These are subdivided into **minutes** ($'$), and the minutes into **seconds** ($''$). As the distance from the Equator to the poles is one-fourth of a circle, it follows that the greatest latitude a place can have is 90° . The North Pole is 90° north latitude, and the South Pole 90° south latitude. The Equator is marked 0° , and the parallels of latitude are numbered 1° , 2° , 3° , &c., from the Equator towards both poles.

15. To definitely fix the position of a place we must not only state its distance north or south of the Equator, but also its distance in the other direction—viz. east or west.

The Equator is divided into 360 degrees, and through each of the divisions circles are drawn, passing through both of the poles. Each of these circles also divide the earth into two equal parts, and are therefore **great circles**; and because all places on the same half of one of these circles have their noon at the same time, each half-circle is called a **meridian**. While it is midday to places on the one half of the circle it is midnight to places on the other half.

By means of these circles we can fix the position of any place east or west. Before this can be done, however, we require a fixed line to measure from. In England we take the meridian passing through Greenwich as the starting-point. This line is numbered 0° , and the other meridians are numbered 1° , 2° , 3° , &c., up to 180° east and west of this line. These lines are called **Lines of Longitude**, and the **Longitude of a place is its distance east or west of any fixed meridian**.

Thus it will be seen that if the latitude and longitude of a place are known, its position on the earth's surface is defined. When we say that a place is in lat. 50° N., and long. 23° E., we mean that it is situated where the 50th parallel north of the Equator cuts the 23rd meridian east of Greenwich.

The parallels of latitude are at equal distances from each other, and if the earth were a perfect sphere a degree of latitude would be of the same length at any part of its surface. Careful measurements show that the length of a degree of latitude increases as we go from the Equator to the poles. In Lapland the degree is about 3,000 feet longer than near the Equator. This furnishes a proof that the earth is flatter towards the poles.

The meridians of longitude converge as they approach the poles, and consequently the length of a degree of longitude gradually decreases as we travel north or south from the Equator. At the Equator a degree measures $69\frac{1}{10}$ miles, at latitude 30° a little under 60 miles, at latitude 60° about $34\frac{1}{2}$ miles; at latitude 80° it is about 12 miles, while at latitude 89° it is only $1\frac{1}{5}$ miles.

As the parallels of latitude decrease in size from the Equator towards the poles, the velocity due to the earth's rotation is much less for places near the poles than for those near the Equator. The velocity at which a place near the Equator moves is at the rate of over 1,000 miles per hour; at latitude 60° it is about half as much, while at latitude 89° it is only 18 miles per hour.

16. It is necessary for sailors and explorers to determine their exact position at frequent intervals. This is done by taking observations of the heavenly bodies.

How Longitude is found.—This is easily determined by a comparison of the time at two different places.

As the earth turns on its axis from west to east at an absolutely uniform rate, every meridian is brought successively in front of the sun every 24 hours. When it is noon at Greenwich it is midnight at a place whose longitude is 180° ; that is to say, it will be 12 hours after Greenwich time before it will be noon at that place. This gives a difference of $\frac{180^\circ}{12}$, or 15° for each hour, or 4 minutes for

each degree. Thus at the West of Ireland, which is 10° W. of Greenwich, noon will be 40 minutes after it has passed at Greenwich, or when it is 12 o'clock at Greenwich it is only 20 minutes past 11 on the West of Ireland; while at Hamburg, which is 10° E. of Greenwich, noon will have passed 40 minutes before it is due at Greenwich. A telegram handed in at Greenwich at 12 o'clock, supposing it to take no time in transmission, would be received at a place 10° W. at 11.20; while at Hamburg, under similar circumstances, the time of receiving it would be 12.40.

At sea the longitude is usually determined by finding the time at the place and comparing it with the time indicated by a chronometer previously set to Greenwich time. The time at the place is found by noting when the sun is at his greatest altitude. It is then *noon*. The chronometer indicates Greenwich time at that instant; from the difference the observer may at once deduce his distance east or west of Greenwich. For example, suppose the difference in time to be 28 minutes, then the observer would be $\frac{28}{4} = 7^{\circ}$ from Greenwich. If Green-

wich time was 28 minutes *past* 12, then his position would be 7° W. longitude, while if Greenwich time was 28 minutes *to* 12, the longitude would be 7° E.; *noon being 4 minutes earlier for each degree to the east, and 4 minutes later for each degree to the west.* Again, St. Petersburg is about 30° east of London; there is therefore a difference of $4 \times 30 = 120$ minutes between the time at the two places: when it is 10 o'clock at London it is 12 o'clock at St. Petersburg.

On land the *electric telegraph* furnishes the best method of ascertaining the difference of time between two places.

17. **How Latitude is found.**—The latitude of a place is most easily found by taking the mean altitude of the Pole Star. *The height of the pole equals the latitude of the place.* At the Equator the Pole Star is seen on the horizon; as we travel north, the star gradually rises above the horizon at the rate of one degree for each degree of latitude passed over, until at the pole it is found to be nearly overhead. For example, if the mean altitude of the Pole Star were found to be 20° above the horizon, then the observer would be 20° north of the Equator.

At sea it is more convenient to determine the latitude from observations of the sun at noon.

18. **THE MOON.**—The earth is accompanied on its journey round the sun by its satellite, the moon, which revolves round the earth, at a distance of 238,840 miles, in 27 days 7 hrs. 43 mins. This period of time is called a *lunar month*. The moon is much smaller than the earth, its **diameter** being about one-fourth (2,163 miles exactly), while its mass is about one-eightieth part of that of the earth.

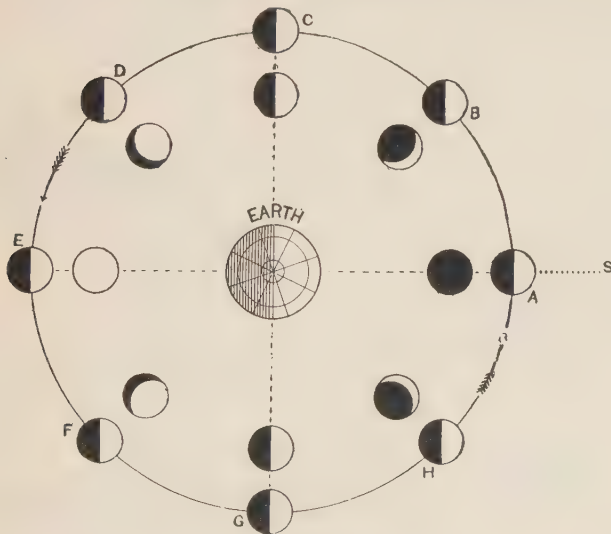
19. **Phases of the Moon.**—The sun always appears to us in the shape of a complete circle. The moon, on the contrary, shows a constantly varying appearance, from a complete circle to a narrow crescent. These different appearances are called the **phases** of the moon, and are due to the fact that she is continually changing her position with regard to both the sun and the earth.

The moon takes exactly the same time (27 days 7 hrs. 43 mins.) to rotate on her axis as she takes to revolve round the earth; hence we always see the same side of the moon. The light she gives is the light of the sun shining upon her, and reflected back upon our earth.

20. In fig. 9, E represents the earth and s the direction of the sun's rays. The outer circle shows the moon as illumined by the sun, while inside is shown the appearance of the moon as seen from the earth.

When the moon is between the earth and the sun, as at A, then her dark side is towards the earth, we receive no light from her, and she is said to be **new**. After about fourteen days, when half her revolution has been performed, and she has reached position E, her light side is towards the earth, and we see what is termed the **full moon**. Midway between A and E, about

FIG. 9.—PHASES OF THE MOON.



seven days after new moon and full moon respectively, we see half the light face, and the moon is in her **first and last quarters** (c and g). In passing from A to c, she appears in the shape of a crescent, as at B, while from c to E the luminous part presents the appearance as seen at d. The moon is then said to be **gibbous**. From A to E she has been *waxing*, she now begins to *wane*, at F she is again gibbous, and at H we again see a crescent as at B.

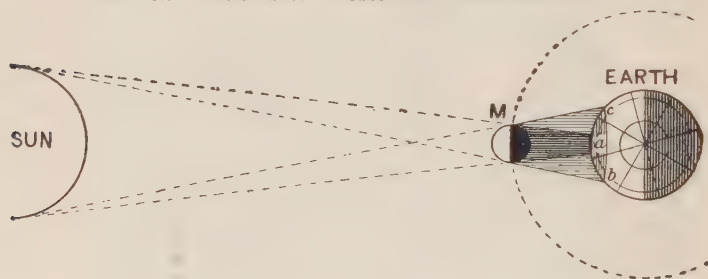
21. **Eclipses.**—When the moon, in the course of her monthly revolution, is in a line with the sun and the earth, as in positions A and E (fig. 9), two results may follow. At A the shadow of the moon may be thrown upon the earth by the sun, causing a **solar eclipse**. At E, the earth's shadow may be thrown upon the moon, causing a **lunar eclipse**. *Eclipses can only happen at new or full moon, because only then is the moon in a line with the sun and the earth.* If the moon's orbit were in the same

plane as the earth's orbit, these eclipses would occur monthly; but the plane of the moon's orbit being slightly inclined to the plane of the earth's orbit, eclipses only occur when the new or full moon crosses the earth's orbit, or the **ecliptic**, as it is usually termed.

22. **Solar Eclipses.**—Figs. 10 and 11 show the position of the sun, moon, and earth during a solar eclipse.

The moon's orbit, like that of the earth, is not circular but elliptical, hence the moon is nearer to the earth at one period of her revolution than

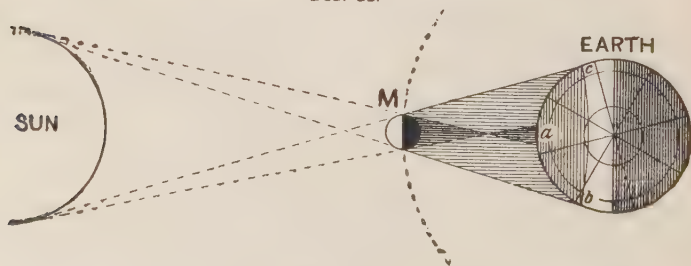
FIG. 10.—DIAGRAMS TO ILLUSTRATE A SOLAR ECLIPSE.



at the other. When she is nearest to the earth (*perigee*), her shadow, which is about as long as her distance from the earth, falls upon a small part of the earth's surface, as at *a*, fig. 10. From this part the sun's rays would be entirely excluded, and to the observer at *a* the eclipse of the sun would be **total**. North and south of the area of total eclipse (reaching to *b* and *c*) a portion of the sun would be visible; hence to the observer within these limits the eclipse would be **partial**.

When, however, the moon is at her greatest distance from the earth (*apogee*), her shadow does not reach the earth's surface (fig. 11), consequently

FIG. 11.



the whole of the sun is not obscured, and a portion of his disc is seen surrounding the moon. This is called an **annular eclipse**.

23. **Lunar Eclipses.**—Figs. 12 and 13 show the position of the sun, earth and moon for a lunar eclipse.

When the full moon passes through the earth's shadow so as to be wholly shut off from the sun's rays, as in fig. 12, then the eclipse of the

FIG. 12.—DIAGRAMS TO ILLUSTRATE A LUNAR ECLIPSE.

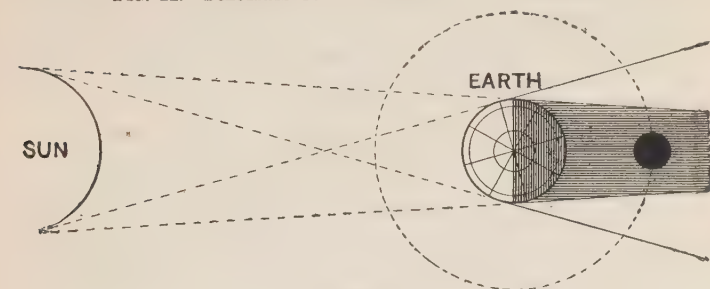
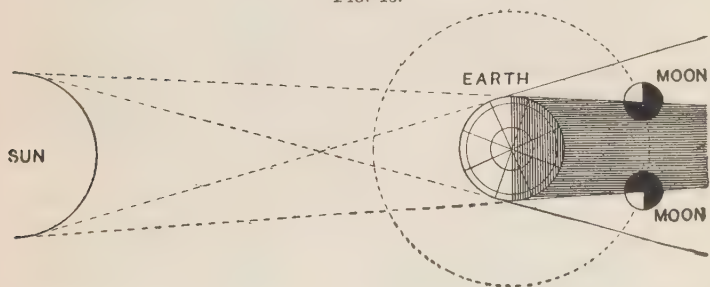


FIG. 13.



moon is total. If, however, the moon is not exactly where her orbit intersects the earth's orbit, then she does not wholly enter the shadow and the eclipse is partial, as in fig. 13.

EXAMINATION PAPERS

- A. 1. Define each of the branches into which geography may be divided, and give three illustrations to each.
2. What is the solar system? Name the various bodies of which the sun is the centre.
3. Give a brief description of the size and appearance of the sun.
4. What are comets, meteors, asteroids, planets, and fixed stars?
- B. 1. Two persons, A and B, are at the seashore. A is at the foot and B at the top of a cliff. A can just see the sails of an approaching vessel. Show by a diagram how much of the vessel can be seen by B.
2. In what way does the moon furnish us with a proof of the earth's rotundity?
3. What is the true shape of the earth? Give its chief dimensions.
4. Describe how day and night are caused. How is the time of the earth's rotation determined?

- C. 1. Define the following terms:—‘Rotation,’ ‘revolution,’ ‘sidereal year,’ ‘orbit.’
2. Compare the diameters of the moon, earth, and sun.
3. What facts lead us to the conclusion that the earth’s axis is inclined to the plane of its orbit?
4. On June 21 the sun’s greatest altitude at two different places is 60° and 30° respectively. Show by a diagram the relative amount of heat received from his rays at each place.
- D. 1. What is meant by greatest altitude, summer solstice, tropic, equinox, Arctic Circle?
2. Name and define the exact position of the zones.
3. Explain clearly the following statement:—Calcutta, lat. $22^{\circ} 36' N.$, long $88^{\circ} 23' E.$
4. Why does a degree of longitude vary in length at different parts of the earth’s surface?
- E. 1. Define the following terms:—‘Great circle,’ ‘small circle,’ ‘meridian,’ ‘Equator,’ ‘latitude,’ ‘longitude.’
2. New York is $74^{\circ} W$ of London. When it is 12 A.M. at the former place, what is the time at the latter?
3. The captain of a vessel takes an observation at noon. The chronometer shows Greenwich time to be 2.40 P.M. What is the longitude? ($40^{\circ} W.$) Show how this is obtained.
4. How does the Pole Star indicate the latitude of a place?
- F. 1. Look at the map of the world and determine to the nearest hour the difference in time between Greenwich and Auckland, New Zealand. Is sunrise earlier or later at Auckland than at Greenwich? Give reasons for your answer.
2. The time of sunrise at Sydney, Australia, is about ten hours earlier than at Greenwich. What is the longitude of Sydney (approximately)?
3. What is the difference in time (roughly) between London and New York, London and Bombay, Bombay and Calcutta, London and Cairo, London and Winnipeg, London and Vancouver, Bombay and Melbourne?
4. When it is 6 A.M. at Greenwich, what is the time (approximately) A.M. or P.M. at Cape Town, Singapore, Adelaide, St. Petersburg, Madras, Chicago, Montreal, Buenos Aires?
- G. 1. Explain clearly the changes in the moon’s appearance from when she is new to when she is full.
2. Why do we not have an eclipse of the moon every month?
3. What is an annular eclipse? Show by a diagram how this is caused.
4. Describe a total eclipse of the moon.

PHYSICAL GEOGRAPHY.

24. GENERAL DISTRIBUTION OF LAND AND WATER.—

The area of the earth’s surface, as has already been mentioned, is about 197,000,000 sq. miles. Of this, about 52,000,000 sq. miles, or a little more than one-fourth, is land; while about 145,000,000 sq. miles, or a little less than three-fourths, is water.

The land is very unequally distributed over the earth’s surface, three-fourths, or 39,000,000 sq. miles, lying north of the Equator, and only one-fourth, or 13,000,000 sq. miles, lying to the south. The Eastern and

Western Hemispheres show a similar disproportion, 37,000,000 sq miles being in the Eastern Hemisphere, and only 15,000,000 sq. miles in the Western. If the globe be divided into two hemispheres, one containing the greatest amount of land and the other the greatest amount of water, England will occupy the centre of the former, which contains about 47,000,000 sq. miles of land ; while New Zealand will occupy the centre of the latter, which contains only 5,000,000 sq. miles of land.

FIG. 14.—LAND AND WATER HEMISPHERES.

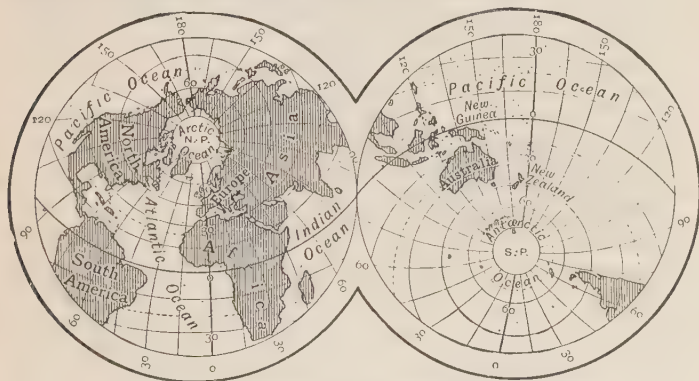
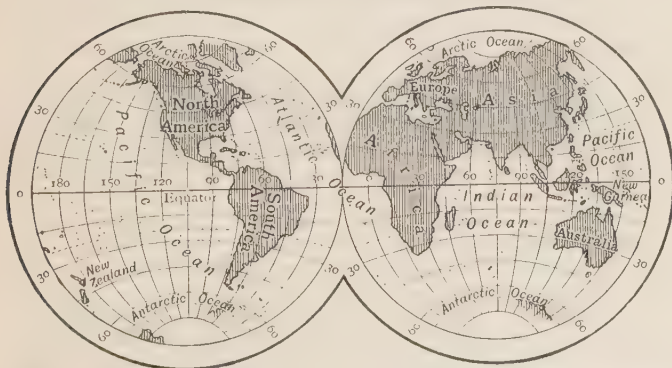


FIG. 15.—WESTERN AND EASTERN HEMISPHERES.



With regard to the distribution of land in the different zones, it will be found that the largest amount, rather more than one-half, lies within the Temperate Zones, where the climate is best suited for the development and progress of mankind ; while about one-twelfth only is found within the Frigid Zones, where the climate is so severe that human life can be sustained only with the greatest difficulty.

25. The Arrangement of the Land.—On looking at the globe it will be seen that the land consists of three large compact

portions, with a great number of smaller scattered ones. The larger portions are termed *continents*, the smaller ones *islands*. The largest portion consists of **Eurasia (Europe and Asia)** and **Africa**; the next of **North and South America**; and the third of **Australia**, which is very much smaller than either of the other portions. The islands, which are distributed all over the ocean, are of all dimensions, from a mere rock just appearing above the surface of the water, to a large mass like New Guinea, which is six times the size of England.

The approximate areas of the Continental masses are :—

Europe . . .	3,700,000 sq. miles	} Old World.
Asia . . .	17,300,000 "	
Africa . . .	11,500,000 "	
North America . .	8,600,000 "	} New World.
South America . .	7,000,000 "	
Australia . . .	3,000,000 "	

There are certain noticeable **points of resemblance** in the great land masses. Generally speaking they are broadest towards the north and taper off towards the south. This is also the case with the great peninsulas jutting from them. In **Europe**, the Iberian Peninsula, Italy, the Balkan Peninsula, and Scandinavia; in **Asia**, the peninsulas of Arabia, Hindustan, Indo-China, Corea, and Kamchatka; and in **America**, the peninsulas of Florida and California all point towards the south. The only important peninsulas which vary from this rule are Jutland in Europe, Labrador and Yucatan in America, and Cape York Peninsular in Australia.

26. THE EARTH'S CRUST.—This means the solid, outside portion, which has cooled and hardened, and which is accessible to our observation. It is made up of mineral masses called rocks.

The term **rock**, when used in a geological sense, does not merely mean hard stone, but any kind of natural stone whether soft or hard. Sand, clay, and coal are as much rocks as limestone or granite.

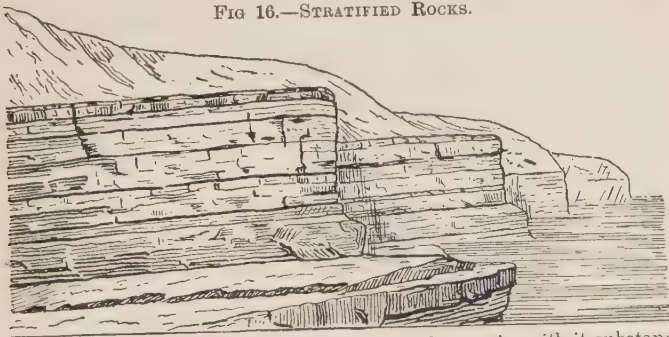
CLASSIFICATION OF ROCKS.—Rocks may be classified according to their mode of formation into two great natural divisions—Stratified and Unstratified.

Stratified rocks lie in layers or strata (fig. 16). Illustrations may be seen on the sides of a railway cutting or in a quarry. We know that these rocks are the result of the action of water; hence they are also termed aqueous rocks.

27. Formation of Stratified Rocks.—Whenever a running stream enters a lake its course is checked, the mud and sand, which are carried along by its current when in motion, sink to the bottom and are deposited in layers, just as may be seen on the surface of the land after a flood. The river Rhone offers a familiar illustration of this action; rising high up in the St. Gothard, it flows through the canton of Valais (the valley) as a rushing, muddy torrent, carrying with it pebbles, sand, and mud. After entering the Lake of Geneva its flow is checked, the heavier pebbles are deposited near the entrance, the sand is borne farther into the lake, while the mud is carried still farther before being deposited. When the river leaves the lake its waters are perfectly clear. All great rivers show a similar action when they reach the sea. The heavier matter settles first, forming sands, which

when hardened become *sandstones*. The smaller particles are carried farther out and form a deposit of mud, which when hardened we call *shale*.

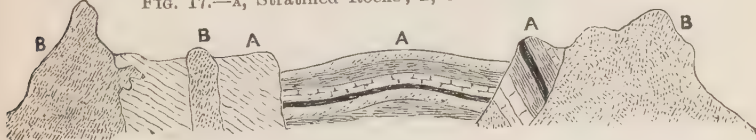
FIG 16.—STRATIFIED ROCKS.



In addition to this sedimentary matter, a river also carries with it substances which it has dissolved while flowing over them. These soluble substances are carried out farthest of all and are ultimately deposited as *limestones*, &c.

Not only does the arrangement in layers and the presence of rounded pebbles indicate a formation due to the action of water, but the remains of aquatic animals, shells, corals, &c., which are found embedded in stratified rocks, furnish another proof of their aqueous formation. The presence of these remains (*fossils*) gives rise to the term *fossiliferous*, which is sometimes applied to these rocks.

FIG. 17.—A, Stratified Rocks; B, Unstratified Rocks.



Stratified rocks may be divided into three classes:—

1. **Sedimentary Rocks.**—These are formed by the action of streams, tides, waves, &c., on the floors of lakes, beds of rivers, or on sea bottoms. *Sandstones* and *clay* (which when hardened forms *shale*), belong to this class.

2. **Organic Rocks.**—These are formed either from the remains of plants, as in the case of *peat* and *coal*; or from the remains of animals, as *lime stones*, *coral*, &c.

3. **Chemically-formed Rocks.**—These are precipitated from the water in which the minerals composing them have been dissolved. *Gypsum*, *rock-salt*, *stalactites* and *stalagmites* have been formed in this way.

28. **Unstratified Rocks** show no traces of beds or layers, and have been produced by the action of heat. Hence they are also termed **igneous rocks**. They contain no fossils and are usually of a crystalline structure.

They may be divided into two classes:—

1. **Volcanic.**—These have been ejected from volcanoes, and cooled and solidified near the surface, such as *lavas* and *volcanic ashes*.

2. **Plutonic.**—These are supposed to have cooled and solidified under great

pressure at a considerable distance below the surface, such as *granites* of various kinds.

29. In addition to stratified and unstratified rocks, there is a third class called **metamorphic rocks**. These are composed of sedimentary rocks which have been changed from their original condition by the agency of heat, pressure, or chemical action, into a more or less crystalline state.

They are found in layers like the aqueous rocks, and frequently show a crystalline structure like the igneous. *Marble* is simply crystallized limestone, in which the fossils have completely disappeared. *Quartzite* is crystallized sandstone. *Slate* is shale hardened by pressure. *Gneiss* is composed of the same minerals as granite but arranged in layers.

30. **Position of Rocks on the Earth's Surface.**—Stratified rocks, which were originally deposited in comparatively horizontal layers, are frequently found raised up as mountains, tilted at a variety of angles, bent and folded in different directions, and cracked at right angles to the lines of the layers.

The raising of rocks above the surface of the water is a gradual change which we know is constantly going on. At the present time some parts of the earth's surface are gradually rising, while other parts show a gradual depression.

FIG. 18.—POSITION OF ROCKS



The interior of the earth is undoubtedly very hot; as the interior cools, the crust contracts and thus causes the strata to be bent. The action of subterranean forces and the throwing up of igneous rocks furnish other causes of the bending of the strata. This bending causes the cracks which may be seen in every quarry. Sometimes the strata has been broken instead of bending, and a fracture called a **fault** is formed. The rocks on one side of the fault are frequently much higher than the corresponding rocks on the other.

31. **SOIL.**—The surface of the land is covered in most parts by a layer of small particles of broken-up rocks called soil. This is the most important part of the earth's surface as far as man is concerned, as it supports vegetable life, which in its turn supports animals, and thus renders the earth habitable by mankind. Soil is formed by the 'weathering' of the rocks. This is chiefly due to atmospheric changes. During the day the heat of the sun causes the rocks to expand, the rapid loss of heat at night causes them to contract, and fractures are thus formed. Water finds its

way in, and by softening the rocks and dissolving the soluble matter causes the rock to crumble. The action of frost greatly assists this process. When water becomes ice it expands and thus forces the particles and masses of rock apart. This breaking up is still further aided by the roots of plants and the action of animals that burrow and live in the ground. The decaying vegetation enriches the soil and imparts to it its dark colour.

On digging into the ground in certain places the changes from rock to soil may be seen. First comes the *soil*, *a* (fig. 19), consisting of fine particles, in which vegetation grows. Next is the *subsoil*, *b*, which consists of larger pieces of crumbling stones gradually increasing in size as we descend, and which contains the roots of the larger plants. Below this the solid rock, *c*, appears broken up into blocks by cracks called *joints*.

FIG. 19.—THE SOIL.



32. AGENTS OF CHANGE.—The earth's surface is constantly undergoing changes. The winds, rain, rivers, the waves of the sea, tides, currents, &c., are continually at work, breaking up the rocks, conveying the particles to fresh places, and forming new strata. This breaking up of the rocks into small particles and their removal by water (thus laying bare other rocks) is called **denudation**.

33. ACTION OF WIND.—The wind blows the sand from the sea shore and sandy wastes and forms sand hills, which often extend inland to a considerable distance, turning what was once fertile land into a desert.

The 'Landes,' between the Gironde and the Adour in France, and extensive tracts on the sea coast of Belgium, have been formed in this manner. The Suez Canal has to be constantly dredged to prevent it being choked up by the sand from the desert. Babylon and Nineveh, formerly great cities, are now entirely buried by the sand.

The fine, sharp particles of sand when blown against rocks gradually wear away their surface. Fig. 20 shows rocks worn away by the sand being constantly blown against their bases.

34. ACTION OF RAIN.—Rain acts upon the earth's crust in two ways.
1. It loosens and carries away the soil. 2. It sinks into the ground and dissolves some of the minerals contained there.

In passing through the air rain becomes slightly acid, and chalk, limestones, and marls, which are chiefly composed of carbonate of lime, are thus more easily acted upon, and great hollows or caves are formed; in some cases rivers flow through underground channels which have been formed in this manner. The water which dissolves the limestone changes again when exposed to the air; some

of the carbonic acid which it contains is lost, and the carbonate of lime which has been dissolved in it is again deposited.

The masses of carbonate of lime, called **stalactites**, which hang like icicles from the roofs of some caverns, have been formed in this way. The drops of

FIG. 20.—ACTION OF WIND UPON ROCKS.



water falling on the floor also deposit their carbonate, gradually forming a mass, which is called a **stalagmite**. In process of time the two meet and form a pillar rising from the floor to the roof of the cavern.

35. **ACTION OF SPRINGS.**—The amount of rain which sinks into the

FIG. 21.—SURFACE SPRING.

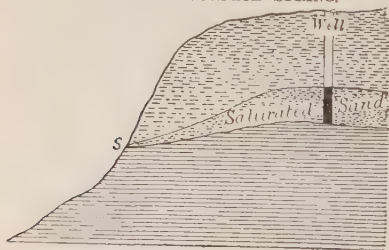
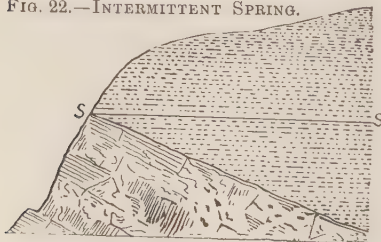


FIG. 22.—INTERMITTENT SPRING.



ground varies according to the character of the surface—if it be clay, little sinks in; if gravel, sand, chalk, or limestone, a great deal is absorbed.

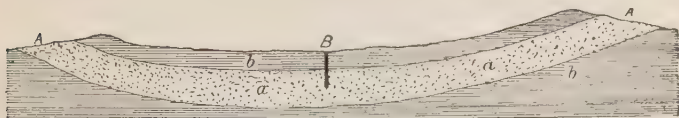
If an open and permeable rock like sand or gravel lies upon a close, impermeable rock like clay, the rain which falls soaks into the gravel and collects in the hollows on the clay. If a hole be dug in the gravel until the clay is reached, the water will rise in the hole nearly to the level of where the gravel is wet, as in an ordinary well (fig. 21). When the strata are on a hillside the water will find its way along the junction of the gravel and the clay and issue as a **surface spring** at s, fig. 21.

When the strata are inclined, as in fig. 22, the water will only flow from s when the level of saturation is above the

line s, s. Hence such a spring is intermittent, and during a dry period may cease to flow.

Where the permeable bed, *a*, lies between two impermeable rocks, *b*, *b*, it becomes saturated at *A*, *A*, where it crops out at the surface. If a well be sunk through the impermeable rock at *B*, the water from *a* will rise to find its own level, and may even rise above the surface at *B*, if its collecting

FIG. 23.—AN ARTESIAN WELL.



ground at *A*, *A* is above the level of the place where the well was sunk. Such a boring is called an **Artesian Well**.

36. Thermal and Mineral Springs.—The water, which appears again at the surface as springs, is in a very different condition from what it was when it entered the ground. When it crops up from a great depth it is heated, and then forms a **thermal spring**. The waters at Bath (the *Aquæ Solis* of the Romans) rise at a temperature of 115° F., those of Carlsbad in Bohemia have a temperature of 150° , some in Japan reach a temperature of 212° , while in New Zealand the natives select the sites for their huts near springs whose waters are sufficiently hot to be used for cooking purposes.

As the water passes through the rocks it takes up quantities of soluble mineral matter, such as carbonate of lime, mineral salts, acids, &c., most of which find their way ultimately to the sea. There the carbonate of lime is taken by the various inhabitants of the ocean to form shells, bones, &c. When the animals die, the remains sink to the bottom and form beds of new limestone similar to the original strata from which the carbonate of lime was dissolved.

Many springs contain salts which are useful as medicines, such as those of Harrogate, Buxton, and Cheltenham in England; Baden in Germany; Carlsbad and Seidlitz in Bohemia; Vichy in France; and Kissingen in Bavaria. Others furnish us with quantities of common salt, such as the brine springs of Nantwich and Droitwich.

37. ACTION OF RIVERS.—Rivers may be said to have three sources of origin. Some, like the Thames, originate in springs which trickle from the hill sides; others, like the Rhone, are formed by the melting of the mountain snows and glaciers; while rivers like the St. Lawrence are the outlets of lakes.

The area drained by a river is its **basin**; the more elevated land separating one river basin from another is the **water-parting**; while the slope down which the river flows is sometimes termed the **watershed**. The springs at the source of a river are fed by rain. These streams unite and form a rivulet. This, with the fresh tributaries it receives, forms the main stream, which carries its water to the sea, there to be again evaporated and formed into clouds, which condense as rain, thus producing a continuous circulation.

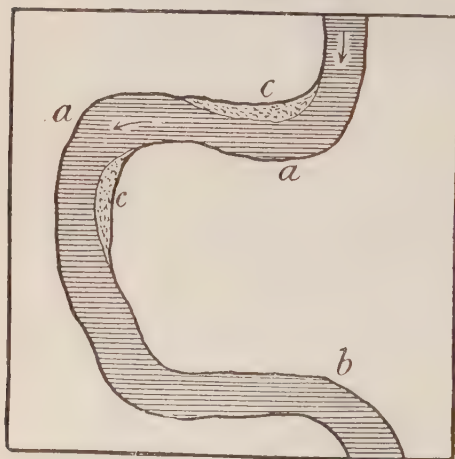
Rivers are most important agents in producing changes on the earth's surface. They act in two ways:—

1. By their erosive action they wear away the surface and form valleys.

2. By transporting the sediment to other places they form fresh deposits known as shallows, sandbanks, and bars.

38. As an **erosive agent** a river is constantly wearing away its bed and banks, sometimes forming deep narrow valleys called **gorges** or ravines, and at other times broader and more open valleys. Where the rocks lie in level beds and where but little rain falls, the ravines are sometimes scooped out to an enormous depth. The cañons of the Colorado in North America afford wonderful illustrations of this action. In some places the river has cut a deep chasm, through which it flows at a depth of nearly a mile below the surface of the plateau. The gorge through which the Niagara flows offers

FIG. 24.—A RIVER CHANNEL.



another striking example. The river flows over the edge of limestone rocks resting on beds of softer shale. The shale is more easily worn away and the limestone, being undermined, falls, filling up the channel and forming rapids. Thus the cataract is steadily advancing towards Lake Erie.

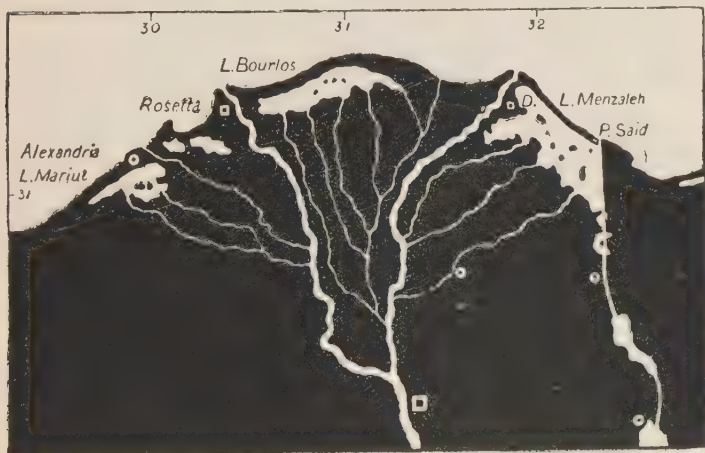
It is only in the *upper part* of its course, where the slope is steepest, that the river bed is continually deepened. In the *middle part* of its course, where the current becomes less rapid, the action of *erosion* more nearly balances that of *deposition*. The banks are worn away on the *concave*

side and deposits are formed on the *convex*. For example, in fig. 24, it is evident that the action of the stream will be to eat away the bank at *a*, where the force of the current would be greatest, and to deposit at *c*, where its force would be much less. In times of flood the river may eat its way from *a* towards *b*, and a new channel be ultimately formed. This often occurs with rivers flowing through a plain. The Mississippi, Volga, and Hwang-ho are notable examples. In some cases towns once important have fallen into decay, the changing of the river bed having diverted the trade from them.

39. **FORMATION OF DELTAS.**—In the *lower part* of its course a river deposits more than it erodes. Where a river enters the sea its flow is checked, and the sediment brought down by it is deposited. Where the tides are strong this sediment is prevented from accumulating at the river mouth, some of it being deposited farther out, forming an obstruction called a bar. If, however, the river enters a comparatively tideless sea, the

sediment is deposited directly the flow of the current is checked, and thus the opening into which the river flows is gradually filled up. In course of time the deposit rises above the surface, and the river forces its way by

FIG. 25.—DELTA OF THE NILE.



several outlets to the sea. This formation is called a **Delta**, from its fancied resemblance to the Greek letter Δ . The Greeks gave this name originally to the Nile delta, with which they were best acquainted. Deltas are not formed by our English rivers on account of the strong tides which carry the sediment away, but a somewhat similar process is being carried on at the mouth of the Thames. A delta begins where the river originally met the sea. This point is called the **head of the delta**.

Fig. 25 shows the Nile delta. Cairo is at the **head**, and Rosetta and Damietta (D) mark the other points of the triangle.

An enormous amount of mud is brought down by some rivers. The head of the delta of the Ganges is 220 miles from the sea, and there is a sea front of about an equal extent. The united deltas of the Ganges and Brahmapûtra contain an area of 40,000 square miles, and at Calcutta the deposit is at least 500 feet deep.

The delta of the Mississippi embraces an area of 12,000 square miles, and at New Orleans the deposit is over 600 feet in thickness. The opening into which the river flowed has been filled up by the sediment, which is now sending out long projections (fig. 26) into the Gulf of Mexico, and extending seawards at the rate of about 330 feet each year.

FIG. 26.—DELTA OF THE MISSISSIPPI.



The river Po pushes its delta seawards about 300 feet yearly. Ravenna, which once stood on a lagoon like Venice, is now four miles inland. The Rhone delta has advanced sixteen miles since 400 B.C.

Rivers not only deposit sediment at their mouths, but also in their beds. The Rhine, Mississippi, and Po have their banks raised in order to protect the land through which they flow from inundation.

40. ACTION OF SNOW AND ICE.—Where the temperature is very low, as in the Polar Regions, the precipitation is in the form of snow during most of the year, and the ground is always more or less covered. In temperate regions the snow that falls soon disappears through evaporation. Near the Equator snow never falls at the sea level. The temperature falls with the increase of elevation as well as with the increase of latitude, and even at the Equator it is possible to rise to a limit above which the temperature is always below freezing point. This limit is called the **snow line**. It is highest near the Equator, where it is in places 18,000 feet above the sea level; on the Alps it is about 9,000 feet; in Norway it falls to 4,000 feet; and near the poles it descends to the level of the sea.

41. Glaciers.—Where the snow accumulates the enormous pressure squeezes the crystals in the lower part so closely together that a compact mass of ice is formed. The midday sun assists this process by melting the surface snow and thus charging the mass underneath with water, which freezes at night. With each winter the surface snow is renewed, and in its turn is converted into ice. The force of gravity and the pressure from behind causes the mass to slip slowly down the valleys as an ice river or **glacier**. The glacier often reaches a considerable distance below the snow line, until the heat of the valley causes it to melt. It generally terminates

in a rough archway of dirty ice, from which issues a stream of milky water.

The rate of motion varies, being faster in the middle than at the sides and bottom, and quicker in summer than in winter. Like a river, its motion is most rapid where the friction is least. The average daily rate of motion of Alpine glaciers in summer is from one to three feet in the centre and about half that rate at the sides.

Moraines.—As the glacier moves on its course, rocks and stones are being continually deposited on its sides from the mountain slopes, forming **lateral moraines** (fig. 27, *a*). When the glaciers from two valleys unite, the two side moraines combine and come down the centre of the

FIG. 27.—A GLACIER.



glacier forming a central moraine, *b*. These are carried down the valley by the glacier and finally deposited at its termination, forming a great **terminal moraine**, *c*.

42. Action of Glaciers on Rocks.—As the glacier creeps down the valley it pushes along the stones beneath. These stones are worn smooth by the

friction against the sides and bottom of the valley, and they in their turn have grooved and marked the rocks over which the glacier has passed. The rocks in the bed of a glacier present a rounded appearance, and are called *roches moutonnées* (sheep rocks). These may be seen when a hot season causes the lower part of the glacier to recede.

As rocks marked in an exactly similar manner, and deposits of stone similar in appearance to moraines are found in many parts of the world, we infer that at some remote period glaciers existed in these places, and that consequently the climate of these countries must have undergone a great change. Such appearances are found in Wales, Cumberland, Scotland, the lower Swiss valleys, and in several countries where no glaciers now exist.

43. Icebergs.—In polar regions enormous glaciers extend into the sea. The great Humboldt Glacier in Greenland has a breadth of 115 miles, and is estimated to be 2,000 feet in thickness. The action of currents and waves undermines portions of the glacier, and huge masses known as **icebergs** are detached and carried off by the currents into warmer latitudes. Here they melt and deposit the boulders and clay, which are frozen in them, at the bottom of the ocean, forming banks like those of Newfoundland.

44. ACTION OF FROST.—The crevices in the rocks become full of water; when this water freezes, it expands and consequently widens the crack, and when a thaw follows, pieces of rock are detached and fall into the valleys.

45. ACTION OF THE SEA.—As the tide rises and falls the action of the waves undermines the cliffs and so gradually wears them away; the harder rocks remaining as headlands and islands, while the softer parts are eaten away to form openings. The rate at which cliffs are worn away varies according to the character of the rocks of which they are composed. Where they are formed of soft rock whole villages have disappeared, as for example on the coast of Suffolk. Cliffs of hard rock wear very little indeed. In some places the action of currents, tides, and rivers causes points to be formed by the accumulation of sand and shingle, such as Dungeness and Spurn Point.

46. CHANGES DUE TO THE INTERNAL HEAT OF THE EARTH.—The action of the agents which we have already considered is to wear away the land and to encroach upon the water. But there are other agencies which counteract this levelling tendency. We find, for example, that elevated portions of the earth's surface, such as table lands and mountain ranges, consist of rocks which must have been formed under water. This is plainly evident from the remains of animals found in them, which we know must have lived in the water. Around the coasts of Great Britain deposits of sand, shingle, and marine shells may be found, lying far above the level which the sea now reaches, indicating that the land must have risen in those places.

To balance this rising we find corresponding areas where the land has gradually sunk. Off the coast of Norfolk remains of trees are visible at low water. These trees evidently grew above the level of the sea. The west coast of Greenland has been gradually sinking for many years; old buildings near the water's edge being now covered by the sea. *Coral reefs and islands* afford another convincing illustration that the earth's surface undergoes changes of level. Traces of coral formation are found above the sea level, indicating that the sea bottom must have been elevated, as the minute animals whose skeletons form the coral cannot exist above the surface of the water.

47. CORAL REEFS are usually divided into three classes.

1. When formed close to the shore they are called **fringing reefs**.

2. When they are at a greater distance, as in the case of the Great Barrier Reef, which runs along the north-east coast of Australia for 1,200 miles, at a distance of about 120 miles from the shore, they are known as **barrier reefs**.

3. In many cases they consist of circular rings enclosing a lagoon of shallow water. These are termed **atolls**.

The theory of their **formation**, according to Darwin, Dana, and others, is as follows. The *coral polyp* cannot exist above, nor at a greater depth than 100

FIG. 28.—A FRINGING REEF.



FIG. 29.—A BARRIER REEF.

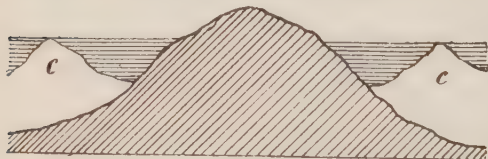
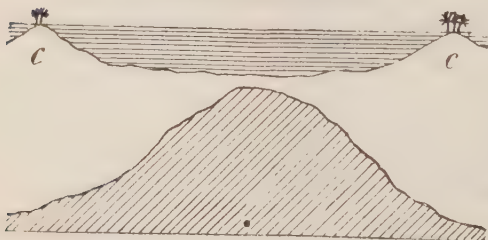


FIG. 30.—AN ATOLL.



feet below the surface of the water. The water must be clear, salt, and with a temperature of not less than 68° F. The presence of mud, cold or fresh water, is fatal to the polyp. Openings in the reefs always occur opposite the mouth of a river or stream. The polyps build up to the surface of the water and then die. Other agencies now continue the work. The waves break off pieces of rock and pile them above the surface. Here portions are ground into sand until a solid compact mass is formed. At this stage it becomes a resting-place for sea-birds; drifting vegetable matter is stranded there, vegetation springs up, its decay forms fresh soil, and the island ultimately becomes covered with verdure.

In fig. 28 we see the reef, *c*, as a **fringe** round an island.

In fig. 29 the gradual lowering of the sea bottom has caused the island to sink, the reef continues to be built upwards, but a wider space now intervenes between it and the land, and the reef is now a **barrier reef**. In fig. 30 the subsidence has caused the island to disappear, leaving the ring shaped **atoll** enclosing a shallow lagoon. Another theory put forward by Mr. Murray, of the 'Challenger' Expedition, is that atolls are formed on submarine volcanoes. Where the volcano approaches near the surface, shells of the organisms living in the sea gradually accumulate until the heap rises sufficiently near to the surface for the coral polyps to build upon. As there would be but little food for them on the inside of the reef, they build outwards, and thus form a ring-shaped atoll.

Most of the coral used for commercial purposes is found in the Mediterranean, the Red Sea, the Persian Gulf, and the China Sea.

The chief coral reefs are found in the Pacific, where there is a belt stretching from the Low Archipelago to the Carolines; in the Indian Ocean, where coral formations stretch from India to Madagascar; and in the Red Sea. In the Atlantic they are found off the coasts of Florida, among the West India Islands, and around the Bermudas. The coral reefs of the Bermudas are farther from the Equator than any other living coral formation. This is due to the warm water of the Gulf Stream.

48. THE INTERNAL HEAT OF THE EARTH.—The temperature of the earth's crust increases with the depth. In mines the temperature rises about 1° F. for every 50 or 60 feet in descent. The existence of hot springs and volcanoes also points to the fact that the interior of the earth must be intensely hot. We also conclude from various reasons that the earth must be slowly cooling. This cooling causes the crust to contract. If the outer crust contracts and crushes in towards the centre, it will have less room in which to spread and must consequently be thrown up laterally, as folds of cloth would be if squeezed from each side while under pressure from above. This lateral pressure is so great that beds of hard rock have been bent and broken in the manner shown in figs. 17 and 18, par. 30.

In places where the crust appears to have been weakest, the strata have been slowly and gradually forced up to great heights, forming *mountain chains* like the Andes, the Himālayas, &c.

49 VOLCANOES.—The interior of the earth is not only exceedingly hot, but it is probable that it contains reservoirs or basins of molten matter. If water penetrates to these heated masses, it is thought that so much vapour is generated that the molten matter is forced up through openings to the surface. The presence of vast quantities of steam during eruptions, and the fact that all the volcanoes of the earth are situated near the sea or lakes, makes it almost certain that water is the principal cause of volcanic action.

A volcano must not be regarded in any sense as a 'burning mountain.' It is a more or less conical elevation, which has been formed by hot matter forced up from the interior through an opening in the earth's crust. This opening, which is called the **pipe**, becomes filled up when the volcano is not in eruption, and forms a cup-like basin at the top, which is called the **crater**.

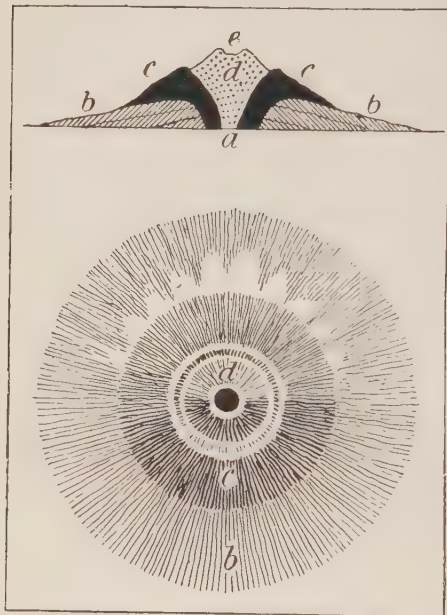
Sometimes the eruption takes place without warning. At other times rumbling sounds are heard, shocks of earthquake occur, springs are frequently affected, and the sea is sometimes violently agitated. Following upon this comes a rush of steam and gas, forcing the refuse from the pipe and carrying volcanic dust and ashes high into the air. Melted rock or **lava** now follows up the pipe and overflows from the edge of the crater, or sometimes, bursting through a fresh crack, forms a new cone. These phenomena are accompanied by thunder and lightning as well as by heavy rain, which condenses the steam.

The figure shows the section of an ideal volcano: *a* is the pipe; *b*,

consolidated volcanic ash or tuff; *c*, solidified lava; *d*, scorix and ashes; *e*, the crater.

50. At present there are over 300 *active volcanoes* on the earth's surface, more than 200 of which are on the shores of the Pacific and Indian Oceans. They are found to follow certain lines, where it is probable that the crust of the earth is weaker than in other parts. One line starts south of Cape Horn (see Map on page 32), follows the Andes

FIG. 31.—A VOLCANO



and the Cordilleras, along the west of the United States and the peninsula of Alaska; it now crosses by the Aleutian Isles to Kamchatka, thence by the Kuriles to Japan, Formosa, and the Philippine Islands; here it divides, one branch going to the west through Java and Sumatra, while the other goes through Celebes, New Guinea, and on to New Zealand, terminating in Mounts Erebus and Terror, near the South Pole. Another great line begins at Jan Mayen Island in the Arctic Ocean runs through Iceland, the Faroe Islands, and Scotland, where an enormous volcano must have been situated, to throw up the great masses of lava which have formed Fingal's Cave and the Giant's Causeway; from here the line passes through the Azores, Canaries, and

Cape Verde Islands to the Cameroon Mountains, near the Gulf of Guinea. A branch from this line crosses to the West Indies, while another extends through the Mediterranean to the Caucasus.

Solfataras and Mud Volcanoes.—When volcanic activity appears to be decreasing, vapours of various kinds, mud, and water are ejected from fissures or cracks known as solfataras. These are numerous in Tuscany, in the vicinity of Rome and Naples, and in Southern Italy. Mud volcanoes are found in Trinidad, New Zealand, and near the Caucasus Mountains.

51. **Geysers** are hot springs liable to periodic eruptions, which are caused by the generation of steam below the surface, as in the case of volcanoes, water being ejected in place of lava. Some geysers are active every few minutes, others every day or at longer periods, but in most cases the eruptions follow at regular intervals. Iceland contains about 100 springs near Mount Hekla. The chief of these, the Great Geyser, sends up at intervals a column of water 100 feet high and 10 feet thick. The North Island of New Zealand also contains geysers and hot springs of great mag-

nitude. Perhaps the most remarkable district is that of the Yellowstone Park in the Rocky Mountains, which contains thousands of vents, from the chief of which a column of water is discharged to the height of 200 feet.

52. Effects of Volcanic Action.—Volcanic eruptions are sometimes most destructive. Catania in Sicily was overwhelmed by an eruption of Mount Etna in 1169, and again in 1669. The eruption of Vesuvius in 76 A.D. buried the towns of Herculaneum and Pompeii. In Iceland, in 1783, a stream 50 miles long, 12 miles wide, and 600 feet in thickness, flowed on till it reached the sea. One of the most terrible eruptions in history occurred in 1883, in the Strait of Sunda, between Java and Sumatra. The small island of Krakatoa was almost entirely blown away, and the sea in a huge wave swept over the coasts of Java and Sumatra, drowning 30,000 people. Dust from this eruption was observed falling on vessels 1,000 miles off. As recently as the year 1886 an eruption in New Zealand laid waste a great extent of country.

Where no eruption has ever been recorded the volcano is said to be extinct. In the Auvergne Mountains of Central France, in Germany, and in the west of the United States, many cones of extinct volcanoes still keep their characteristic form. In some cases denudation has worn away the hill, and only the plug of lava filling up the pipe remains. Where no eruption has occurred within recent times the volcano is said to be **dormant**. Cases of this kind may become **active** at any time.

53. EARTHQUAKES are closely allied to volcanoes and are due to similar causes. Some are caused by the breaking of the strata under the strain of the contraction due to the cooling of the earth's crust; others may be caused by the sudden generation and expansion of steam; while in some cases an earthquake may be due to the actual falling in of portions of the earth's crust.

Within recent times the study of earthquakes (**seismology**) has received special attention, and instruments called **seismometers** have been devised for measuring the shocks.

Districts where Prevalent.—No part of the world is entirely free from earthquake shocks, but they are most common in volcanic districts. The connection between earthquakes and volcanoes is shown by the facts that earthquake shocks frequently occur before and during volcanic outbursts, and that the most violent shocks take place in volcanic regions. The districts in the Old World which suffer most from earthquakes lie in a line running from the Azores through the Mediterranean (especially Southern Italy), Asia Minor, the great tableland of Asia, to Japan. In the New World the line of the Andes is the district where their effects have been most disastrous. Slight shocks of earthquake are occasionally felt in the British Isles.

Effects of Earthquakes.—In some cases coast lines have been raised, as in Chili, New Zealand, and Cutch in India. The most disastrous results occur when the shocks originate beneath the sea. Huge waves are then formed, the sea withdraws and then returns upon the land, sweeping all before it. The great loss of life at the Lisbon earthquake, 1755, was largely due to the great waves, some of which were 60 feet in height, which came up about an hour after the buildings had been levelled by the shock. In 1724 a wave 80 feet high, following on the destruction of Lima, overwhelmed Callao. In 1878 the earthquake which devastated a great part of Peru and Ecuador was followed by a wave which destroyed Arica, and swept the vessels lying in the harbour a considerable distance inland. In the year 1906 the city of San Francisco was almost destroyed.

54. EFFECT OF HUMAN AGENCY.—In addition to the natural agencies which have been mentioned, considerable changes affecting the earth's surface are due to artificial agencies. The drainage of the Fenlands has

FIG. 32.—LINES OF VOLCANOES.



changed a swampy district into fertile land. In Holland large areas have been drained and made fertile in a similar manner. The **cutting down of forests** has in some cases caused the climate of a district to become drier; trees attracting and holding moisture. This clearing away of trees on hill sides has in some cases caused the soil to be washed away and the rock to be laid bare. The **planting** of the sand dunes in France prevents their advance, and fertilises the ground, so that large areas are now covered with pine forests which were formerly shifting wastes of sand.

EXAMINATION PAPERS

- A. 1. Say what you can of the distribution of land on the earth's surface, and mention any points of resemblance in the great land masses.
2. Distinguish between a mineral and a rock. Describe three common rocks and explain their origin.
3. What are stratified rocks? Explain how they are formed, and mention six common examples.
4. What do you know of the formation of shale, rock-salt, lava, marble, granite?
- B. 1. What are the chief agents which cause changes on the earth's surface?
2. Give what evidence you can to prove that some parts of the earth's surface have been upheaved in recent times.
3. Give a short account of the different kinds of springs, and illustrate your answer with diagrams.
4. How does the water of a mineral spring differ from rain water?
- C. 1. How are stalactites formed, and where are they found?
2. Describe the formation of a river valley.
3. What is a delta, and how is it formed?
4. What materials are carried by rivers in solution, and what becomes of them when the rivers enter the sea?
- D. 1. What is a glacier? Describe its action on the rocks.
2. What are geysers? Whence do they derive their heat, and where are they principally found?
3. What is the snow-line? On what conditions does the height of the snow-line on different mountains depend?
4. What are coral reefs? How are they formed, and where are they chiefly situated?
- E. 1. What reasons can you give for believing that a high temperature exists in the interior of the earth?
2. Describe the structure and formation of a volcanic cone.
3. What are the chief products of a volcanic eruption? Give the chief lines of volcanic action.
4. How are earthquakes caused, and in what districts are they most common?

THE OCEAN

55. As has already been stated, about three-fourths (145,000,000 sq. miles) of the earth's surface is covered by water. This water area is divided into five parts by the masses of land.

1. The **Atlantic Ocean**, separating America from Europe and Africa.
2. The **Pacific Ocean**, lying between America and Asia.
3. The **Indian Ocean**, which washes the shores of Eastern Africa, Southern Asia, and Western Australia.
4. The **Arctic Ocean**, which washes the northern coasts of Europe, Asia, and America.
5. The **Antarctic Ocean**, which lies within the Antarctic Circle.

The colour of the ocean varies from a pure blue in its deepest parts to a greenish colour as it nears the land. Local circumstances cause changes in its appearance in many parts. The great Chinese rivers bringing down quantities of yellow mud explain the name Yellow Sea.

The chief salts present in its waters are—Common salt (chloride of sodium), 2·7 per cent., chloride of magnesium, and sulphates of magnesium and calcium. The degree of saltiness is also subject to variation. In seas where the supply of fresh water brought by the rivers exceeds the evaporation, as in the Baltic Sea, Hudson's Bay, &c., very little salt is present; while in the Mediterranean and Red Seas, where the evaporation exceeds the amount of water supplied by the rivers, the percentage of salt is much greater. The Red Sea, receiving no rivers, is the saltiest part of the ocean.

56. TEMPERATURE.—Land becomes heated much more readily than water, but parts with its heat much sooner, hence the tendency is for the water to be more uniform in its temperature than the land; and as the waters of the ocean are constantly circulating, currents from warm latitudes with the warm breezes that accompany them, raise the temperature of the districts whose shores they wash, while currents from cold regions lower the temperature. Thus it is that the warm winds that blow so frequently in the same direction as the Gulf Stream keep the harbours of Norway open throughout the year, while the icy waters of the Arctic Current close the St. Lawrence for navigation in winter, although the latter is more than 20° nearer the Equator.

The temperature of the surface of the ocean varies according to the latitude and the seasons. Near the equator the average surface temperature is 80° F. The southern part of the Red Sea reaches 90° . Around our own island it varies from 49° in winter to 60° in summer.

While at the surface there is a great range of temperature, at great depths in the ocean there is very little variation. By means of the thermometer the temperature is found to decrease with the depth until about 35° F. is reached. This low temperature is due to the flow of colder and denser water from the polar seas along the floor of the ocean. In Arctic regions the

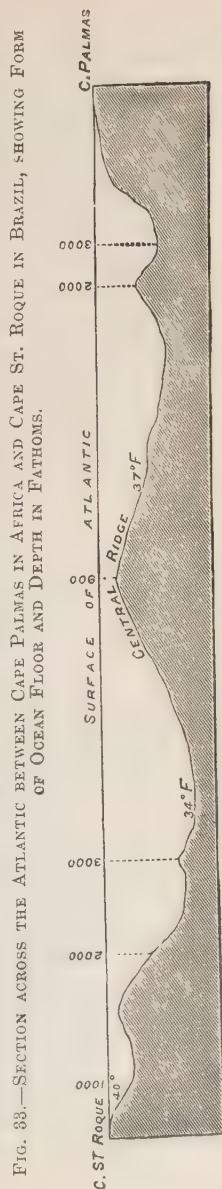
surface water is colder than at a greater depth, and the thermometer consequently rises until the average temperature is indicated.

57. DEPTHS OF THE OCEAN.—By means of carefully-devised apparatus, soundings of great depths have been attained. The average depth of the Pacific is estimated to be from 15,000 to 18,000 feet. The greatest depth lies to the east of Japan, where a sounding of nearly 28,000 feet has been obtained. The Atlantic is not quite so deep, the deepest part, near the island of St. Thomas in the West Indies, being 27,000 feet deep. The Indian Ocean averages about 12,000 feet, and is deepest near its eastern side. Around Great Britain, which rises from a shallow plateau, the depth is nowhere very great, the deepest part of the North Sea being not more than 600 feet.

58. MOVEMENTS OF THE OCEAN.—There are three movements of the waters of the ocean—waves, currents, and tides

WAVES are caused by the friction of the wind on the surface of the water. In deep water they do not really advance forward; it is only the form of the wave which advances. As the waves approach the shore the up-and-down motion is converted into a forward motion; the bottom part of the wave being retarded by contact with the shore, the crest rushes forward and breaks.

In a gale the waves strike the coast with great force, breaking off masses of rock, which are hurled one against the other until they are broken into smaller pieces, and finally ground into sand. The smaller particles are then carried by tides and currents farther out to sea. The action of waves in wearing away coast lines is aided by the boulders, which are hurled against the cliffs, grinding away the lower portion until the overhanging part falls. This action is especially destructive where the rock is soft, or where a softer rock underlies a harder one. In heavy storms waves sometimes rise to the height of 40 feet, and from crest



to crest exceed 500 feet. On an exposed coast the force with which they strike the shore is as much as three tons to a square foot.

59. CURRENTS.—These are the most important of the movements of the waters of the ocean, on account of their effect upon climate.

Causes.—Differences of opinion exist as to the causes of currents; the unequal temperature of the equatorial and polar regions, the action of prevalent winds, and the unequal evaporation in tropical and arctic districts, are all put forward as reasons.

The surface water in the equatorial regions, being heated much more than that near the poles, expands, and its level is slightly raised above the colder and denser water of the polar regions. The tendency will then be for the warmer water to flow as a **surface current** towards the poles, and consequently a colder **under-current** flows from the polar regions towards the Equator.

This circulation of water towards north and south is modified by the following agencies:—

1. **The Direction of the Prevalent Winds.**—This is by some writers put forward as the main cause of currents, and, as far as surface currents are concerned, the winds are undoubtedly powerful agents. In the regions of the trade-winds, which blow constantly towards the north-west and south-west, we have the great equatorial currents flowing towards the west. The Antarctic Current, the Gulf Stream, and the Japan Current, have an easterly direction owing to the action of the prevailing winds, which blow towards the east.

2. **The Rotation of the Earth on its Axis.**—According to Ferrel's law, *this rotation deflects all ocean currents to the right when north of the Equator, and to the left when south.* If we look at the great equatorial currents, we find in the Atlantic that the North Equatorial Current turns to the right and forms the Gulf Stream, while the South Equatorial Current turns to the left and forms the Brazilian Current. In the Pacific, the Japan Current and the New South Wales Current are formed in a similar manner. In the Indian Ocean there is only the South Equatorial Current, which is deflected to the left southwards along the coasts of Africa and Madagascar.

3. **The Configuration of the Land.**—If there were no land masses near the Equator, there would be a constant westerly flow of water all round the earth. This is prevented by the coast of America in the Atlantic, the East Indian Islands in the Pacific, and the East Coast of Africa in the Indian Ocean, and the warm waters of the equatorial currents, being deflected north and south, send some of the heat of the Torrid Zone to colder regions. Part of the water returns eastward as a counter-current between the North and South Equatorial Currents.

60. **Influence of Currents on Climate.**—The warm waters from the tropics tend to raise the temperature of the polar regions, while the colder waters from the poles lower the temperature of the districts near the

Equator. This is illustrated in a striking manner in the North Atlantic Ocean. The Gulf Stream and the warm south-west winds that accompany it keep the harbours of Norway open throughout the year; while the entrance to the Baltic, 1,200 miles farther south, is thickly coated with ice, and the harbours of the Black Sea, still nearer to the Equator, are frozen over in winter. On the American side, the cold Arctic Current, bringing icebergs from Greenland, lowers the temperature so much that Labrador, which is in the same latitude as England, has its coasts bound with ice for nine months of the year; and the winter temperature of the waters of New York Harbour, in lat. 40° N., are as cold as those near the North Cape, in lat. 71° N. In the Pacific Ocean the cold current from the Antarctic Ocean flowing northwards along the western shore of South America makes the temperature of the west coast much lower than that of the east.

Where cold and warm currents meet, dense fogs are frequent, as off the Great Bank of Newfoundland, where the cold Arctic Current meets the warm Gulf Stream.

Sudden and violent storms are caused by differences in temperature. The hurricane district of the Atlantic follows the line of the Gulf Stream, and that of the Indian Ocean occurs where the warm Equatorial Current approaches the cold Antarctic Drift.

Influence of Currents on Commerce.—Harbours are kept open by warm currents, and thus trade can be carried on throughout the year. They are also of service in the navigation of ships; thus, outward-bound vessels keep well to the south of the Cape of Good Hope to avoid the Agulhas Current, while those bound for home keep close to the coast to avail themselves of its assistance.

The chief food fishes are denizens of cold water, and, owing to the influence of cold currents, are found much nearer the Equator than they otherwise would be. The great fishing ground of Newfoundland is where the cold Arctic Current meets the Gulf Stream, and that off the northern coasts of the Japanese islands is where the cold current from Behring Sea meets the Japan Current.

61. Currents of the Atlantic.—The continuity of the flow of the currents is best followed by starting from the south. Part of the great flow of water from the Antarctic Ocean passes to the north, along the western side of Africa, and when turned by the earth's rotation and the trade-wind it sweeps to the west, and helps to form the **South Equatorial Current**. On meeting the wedge-like projection (Cape St. Roque) of South America, this current is split into two parts. One portion is deflected south as the **Brazilian Current**, which, on nearing the mouth of the La Plata, turns east, and loses itself in the cold Antarctic Current.

The other part enters the Caribbean Sea, passes round Cuba, just enters the Gulf of Mexico, and flows through Florida Strait as the famous **Gulf Stream**, a current of dark-blue warm water, about 40 miles in width, over 3,000 feet deep, flowing at the rate of about five miles an hour in its middle part, and having a

temperature of 85° F. As it leaves Florida Strait it is joined by the **North Equatorial Current**, and the whole stream now flows across the Atlantic in a north-easterly direction, gradually spreading out and decreasing in its velocity. Off Newfoundland its width has increased to 320 miles, its velocity has diminished two-thirds, and its temperature has fallen to about 60° F. Towards the middle of the Atlantic it divides into two branches, one of which turns southward by Portugal and Africa, and rejoins the North Equatorial Current, thus completing the circuit. Within this whirl the water is comparatively still, and becomes the receptacle for a great mass of seaweed and driftwood known as the **Sargasso Sea**. The other portion of the Gulf Stream continues in a north-easterly direction past the British Isles and North-Western Europe, throwing off a branch by Iceland, which keeps the harbour of Reikjavik open when the shores of Greenland are blocked with ice, and which gradually loses itself in the cold waters of the Arctic Ocean.

The **Arctic Current** flows from the north by Greenland, and, uniting with the **Labrador Current** from Baffin's Bay, flows south till it meets the Gulf Stream. Part of its cold waters sinks under the warmer waters of the Gulf Stream, while the other portion hugs the eastern shores of the United States until it is ultimately overcome by the warmer current. The Arctic Current brings with it large numbers of icebergs, which melt on reaching the Gulf Stream, and deposit their rocks and sediment, thus helping to form the Great Bank of Newfoundland. The boundary between the cold green waters of the Arctic Current and the warm deep-blue waters of the Gulf Stream is very clearly marked, and is known as the **Cold Wall**.

62. Currents of the Pacific.—A similar circulation is found in the Pacific. The **Antarctic Current** sweeps northward along the western shores of South America under the name of the **Peruvian** or **Humboldt Current**, keeping these shores much cooler than they otherwise would be. Near the Equator it is turned to the west, and becomes merged in the **South Equatorial Current**, which, after sweeping for 8,000 miles across the Pacific, is mostly deflected to the left by the east coast of Australia as the **New South Wales Current**, which ultimately mingles again with the Antarctic Current. The northern part of the Equatorial Current is turned to the right, and forms the **Kuro Siwa**, or **Japan Current**. This current is probably larger than the Gulf Stream, which it resembles in many respects, but its waters, not being confined like

the waters of the Gulf Stream, do not flow so swiftly. Its name **Kuro Siwa**, or Black Stream, is due to the dark-blue colour of its waters. It flows north by the coast of Japan, meets the small **Arctic Current** from Behring Strait, and turns to the east, warming the southern shores of Alaska. It now divides, part flowing by Mexico as the **Mexican Current**, while the other portion returns into the North Equatorial Current, completing the circuit of the North Pacific, and enclosing a Sargasso Sea of smaller magnitude than that of the Atlantic.

63. Currents of the Indian Ocean.—The currents of this ocean are almost entirely regulated by the winds. Part of the Antarctic Current flows by the west coast of Australia. Near the Equator it is turned to the west by the wind, one branch going south by Madagascar and returning to the Antarctic Current. The larger portion flows north of Madagascar, where it is joined by the drift current caused by the monsoon, and then passes down the Mozambique Channel to the south of Africa, where, under the name of the **Agulhas Current**, it turns southward for a considerable distance, and ultimately loses itself in the Antarctic Ocean.

64. Comparison of the Atlantic and Pacific Circulations.—It will be noticed that the circulations in the Atlantic and Pacific present many points of resemblance. Each ocean has two complete circulations, one north and one south of the Equator, the currents of which correspond to a marked extent. The cold climate of North-eastern Asia resembles that of North-eastern America, while the West of North America corresponds with Western Europe. The fogs of the Aleutian Islands are similar to those of Newfoundland. Iceland is supplied with driftwood by the Gulf Stream, and in the same manner the Aleutian Islands are supplied by the Kuro Siwa.

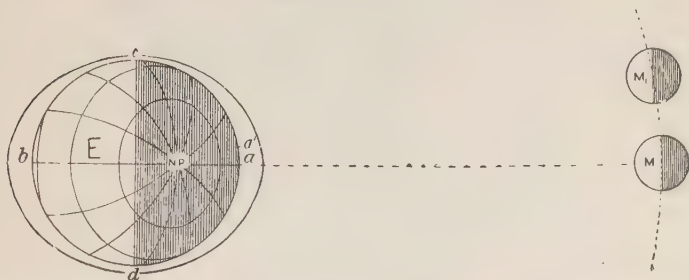
Currents due to Local Causes.—These are quite independent of the great oceanic circulation. Strong currents flow into the Mediterranean and Red Seas because the evaporation exceeds the supply brought by the rivers; while from the Black Sea, Baltic Sea, and Hudson Bay, currents flow out because the rivers bring an excessive supply of water. Great rivers like the Amazon, La Plata, and Congo cause currents which extend a considerable distance out to sea.

65. TIDES.—The alternate rising and falling of the waters of the ocean are called tides. The rising produces the **flood tide** and the falling the **ebb tide**.

Causes.—Tides are chiefly due to the difference between the attraction exerted by the moon on the solid earth and that exerted on the more easily moved water. If we imagine the earth (fig. 35, B) to be completely covered with water, then the

attraction of the moon (M) would be most strongly exerted at *a*, because *a* is nearest to the moon. The water, being more mobile than the earth, would be drawn away from *c* and *d* and heaped up at *a*, causing a *high tide*. In the same manner the

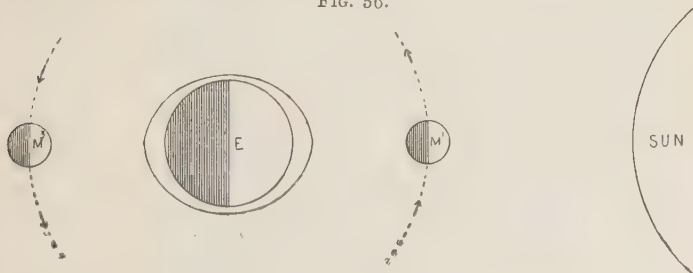
FIG. 35.—DIAGRAMS TO ILLUSTRATE 'TIDES.'



solid earth is nearer to the moon than the water on the opposite side at *b*, and hence it is more strongly attracted and drawn, as it were, from the water at *b*, leaving it heaped up, and thus causing a *high tide* on the side opposite to the moon. Hence, there are two high tides at the same time—one near the moon, as at *a*, and one on the opposite side, as at *b*. Midway between these points there will be low tides on both sides of the earth.

The earth's rotation causes each place on the ocean to have two high and two low tides every day. The reason that the interval between high tide and its corresponding tide next day is more than 24 hours (24 hrs. 51 mins.) is that, while the earth is making one rotation, the moon, which is also revolving round the earth, has reached position *M*₁; hence the earth has to turn a little farther (to *a*₁) to come in the same position with regard to the moon. If it be high tide at noon, then it will be high tide on the next day nearly an hour later.

FIG. 36.



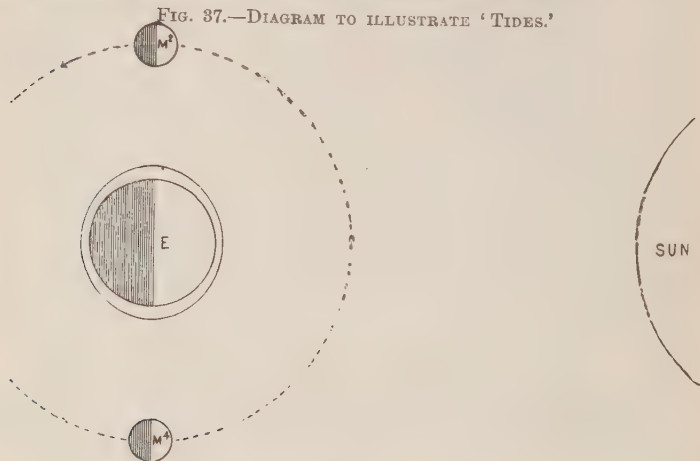
66. The sun also exercises a similar influence to the moon in causing

tides, but its attraction is not nearly so strong on account of its greater distance from the earth. The sun's influence in causing tides is not more than two-fifths of that exercised by the moon.

Spring and Neap Tides.—At *new moon* and *full moon* (fig. 36, M^1 and M^3) the sun and the moon are both in a line with the earth; hence their influence is exerted in the same direction, and they jointly cause a higher tide than at other times. These higher tides, which occur at fortnightly intervals, are called **spring tides**.

When the moon is at her first and third quarters (fig. 37, M^2 and M^4), her influence is exerted at right angles to that exerted by the sun, and the tides are consequently somewhat lower. These are called **neap tides**.

FIG. 37.—DIAGRAM TO ILLUSTRATE 'TIDES.'

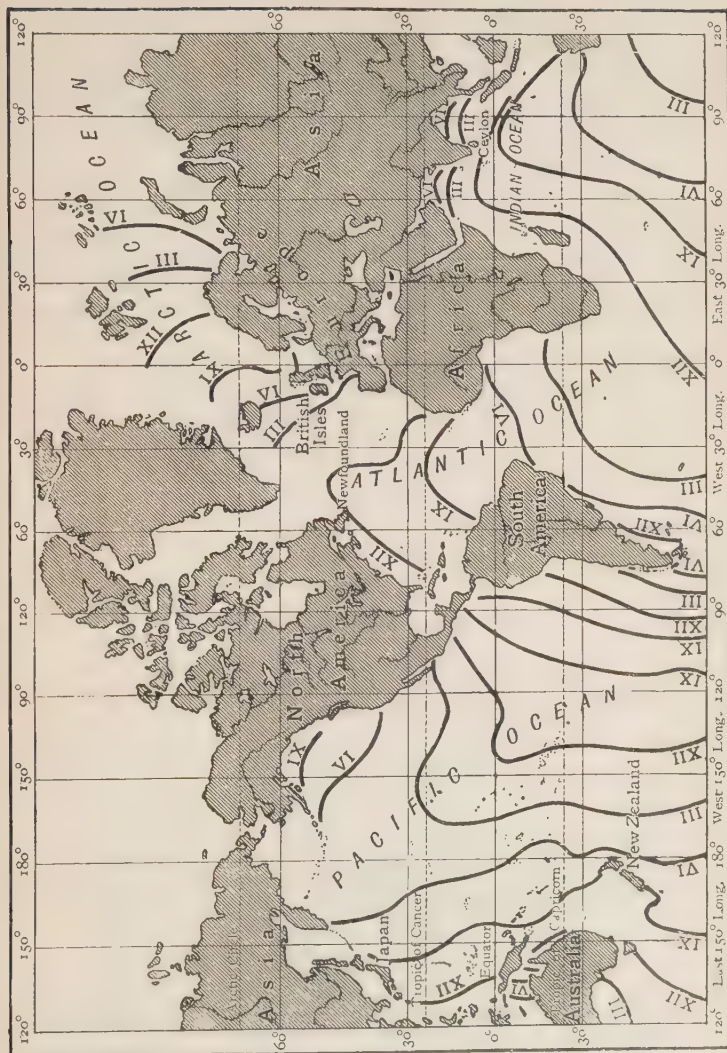


67. **Variations in Tides.**—1. **Direction.**—If the earth's surface were covered with water, there would be two tidal waves moving round the earth from east to west (in a contrary direction to the earth's rotation) in 24 hrs. 51 mins. Considerable variations are caused (1) by the inequalities in the bed of the ocean, the wave moving more rapidly in deep than in shallow water; (2) by the outline of the great land masses. In the South Pacific, where there are no great masses of land to interfere with its progress, the crest of the tidal wave is north and south. In the North Pacific it becomes greatly bent. In the Atlantic the tidal wave advances from south to north.

Fig. 38 shows by co-tidal lines the progress of the tidal wave at intervals of three hours. Thus, the high tide occurring in the South Pacific at noon reaches New Zealand in six hours and Australia in twelve hours. The high tide of the mid-Atlantic reaches Ireland in six hours and the North Cape in twelve hours.

2. **Height.**—Where the tide wave flows in shallow water the bottom part of the wave becomes retarded, and the advancing waters overtake those in front and cause the tide to be much higher than it otherwise would be. This accounts for the relatively high tides experienced on the coast of the British Isles. The shallow plateau from which our islands rise

FIG. 38.—CO-TIDAL LINES.



Every Walker & Co.

Loignans, Green & Co., London, New York, Bombay & Calcutta.

retards the Atlantic tidal wave, which has now turned towards the east, and the waters are heaped up. (See Map on p. 138.) Where this wave enters a funnel-shaped opening the waters are frequently piled up to a great height. In the Bristol Channel the tides sometimes rise to a height of 50 feet, and in the Bay of Fundy to 70 feet. When the tidal wave approaches the British Isles it divides, one portion proceeding up the English Channel, while the other flows along the west coast and round by the North of Scotland. Hence on the east coast there are two tide waves. Where the two waves meet, a higher tide is caused, while where the high tide of one wave meets the low tide of the other there may be very little tide.

In inland seas the tide is very small. The Mediterranean has a tide of from eighteen inches to three feet. In the Baltic it is smaller still, and on the great lakes of North America tides of only an inch or two occur.

68. Character of the Tidal Wave.—In mid-ocean the tidal rise is only two or three feet. There is no onward motion, but merely a rising and falling. This undulatory movement is converted into a forward motion by the outline of the land and by the advance of the tidal wave into shallow water.

Bores.—In some rivers, where the mouth contracts like a funnel, the tide ascends in a great wave as a nearly upright wall of water. In the Severn the bore rushes up as a wall eight or nine feet in height. Bores of considerable magnitude occur in the Hooghli, Seine, Garonne, Amazon, etc. In the Tsien-tang, in China, the bore is sometimes 30 feet high, and travels at the rate of 20 miles an hour.

Influence of Tides.—Commercially they are of great service in taking ships up rivers and floating them back, and thus enabling vessels to penetrate further into the land. They are also of great service in scouring out river channels and cleansing them from refuse.

EXAMINATION PAPERS

- A. 1. State what you know of the composition of sea-water.
2. Say what you can of the temperature of the ocean.
3. Describe the action of waves on a rocky coast.
4. How are currents caused?
- B. 1. What is the Gulf Stream? Describe its course.
2. Trace the oceanic circulation of the Pacific.
3. Show how currents affect the climate of a country.
4. Account for the great fisheries off the coast of Newfoundland.
- Where is there a similar abundance of food fishes?
- C. 1. What are the tides? How are they caused?
2. Explain the terms 'spring' and 'neap' tides. Show by means of diagrams the action of the sun and moon in causing them.
3. Why do tides vary in their direction and height?
4. What are co-tidal lines, bores, whirlpools?

THE ATMOSPHERE

69. The atmosphere is the gaseous covering which envelops the globe. It is a mixture consisting chiefly of two gases—oxygen and nitrogen, not chemically united, in the proportion

of 21 volumes of oxygen to 79 of nitrogen, with small traces of other gases, of which argon and carbonic acid are the chief. Watery vapour is also always present. The atmosphere decreases in density as we ascend. The layers of air nearest the earth's surface, having the greater weight above them, and being more strongly attracted by the earth, are the most dense. As we ascend the air becomes less dense, and it is estimated that at a height of seven miles the air would be so rare that breathing would be impossible. For all practical purposes 200 miles has been fixed as the limit of its extent.

70. WEIGHT AND PRESSURE OF THE ATMOSPHERE — The pressure of the atmosphere is determined by means of the **barometer**. If a glass tube about thirty-three inches long be closed at one end and filled

FIG. 39.—THE BAROMETER.



with mercury, and the open end be inverted in a cistern of mercury, the liquid in the tube will fall until its surface is about thirty inches above the level of the mercury in the cistern, the weight of the mercury in the tube being balanced by the downward pressure of the air upon the surface of the mercury in the cistern. A column of mercury 30 inches in height is therefore equal in weight to a column of air having the same sized base,

and extending in height to the limit of the atmosphere. Now, a column of mercury 30 inches in height, and having a cross-section of 1 sq. inch, weighs a little under 15 lbs.; hence the pressure of the atmosphere is about 15 lbs. on each sq. inch of surface.

That we do not feel this great pressure is due to the fact that the air presses equally in all directions. As we ascend the air is less dense, the pressure diminishes, and the barometer consequently falls. On the top of Mont Blanc (over 15,000 feet high) the barometer falls to a height of about fifteen inches. The falling of the barometer is sometimes used as a means of measuring the altitude of mountains, but allowances for variations in temperature and pressure must be made.

It is also found that the boiling point of water varies as we ascend. At the level of the sea, water boils at a temperature of 212° F. On the top of Mont Blanc it boils at 185° F. The boiling point is 1° F. lower for every 590 feet of ascent. Thus it is apparent that elevation may be approximately determined by this means also.

The pressure of the atmosphere varies not only at different elevations, but also at different places at the same level. This is due to two causes:—

1. **The Variation in the Temperature.**—Heat causes the air to expand and become less dense; the pressure is therefore diminished, and the barometer falls. When the air is cold it is denser, and the barometer rises.

2. **The Variation in the Quantity of Watery Vapour contained in the Air.**—Watery vapour is lighter than air. Hence, when large quantities of vapour are present in the air the mercury falls. When the air is charged with vapour it is more likely to rain; hence the reason why a *fall of the barometer is an indication of rain.*

Isobars are lines drawn through places that have equal barometric pressure during certain periods. The Map on p. 142 shows the isobars that cross England, and a study of this will explain how the rainfall, variation in temperature, and relief of the land affect the direction of the isobar; e.g., following the isobar of 29.94° from the Bristol Channel the line curves northward, the barometric pressure being influenced by the watery vapour in the atmosphere near the sea, and by the elevation of Mid-Wales and Derbyshire.

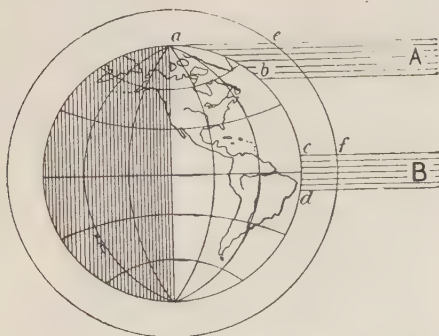
71. TEMPERATURE OF THE ATMOSPHERE.—The air receives nearly all its heat from the sun. The sun's rays in passing through the atmosphere impart some heat to it, but the greater amount of its heat is obtained by the radiation from the earth, which, warmed by the sun, throws off its heat and warms the air in contact with it. The temperature of the air is measured by the thermometer. In Fahrenheit's thermometer *freezing point is marked 32° and boiling point 212°* , the interval between being divided into 180 equal parts. The temperature of the air at any place is affected by the following considerations:—

1. **Latitude.**—The sun's rays fall more directly upon the earth's surface at the Equator than at the poles, and consequently impart more heat there, for two reasons: (a) They reach the earth by a shorter route, and thus lose less heat in passing through the air. (b) A given quantity of rays falls on a smaller area near the Equator than towards the poles, and therefore impart more warmth. This may be easily seen from fig. 40. If A and B represent equal columns of rays, it is evident that the heat from A is

distributed over $a b$, a much larger portion of the earth's surface than $c d$, which receives the heat from B . If the outer circle represents the limit of the atmosphere, it will be apparent that the ray $a e$ has a much greater amount of atmosphere to pass through than $c f$, and consequently loses more heat in the passage.

2. **Elevation.**—There is less radiation of heat from the earth's surface to the higher air, which is thinner and cannot receive so much heat. The

FIG. 40.—TEMPERATURE OF ATMOSPHERE.



higher air also contains less watery vapour, which tends to check the radiation of heat from the surface of the earth. Hence an ascent of a few thousand feet at the Equator produces as great a change in the temperature as travelling a few thousand miles towards the poles.

The influence of elevation upon temperature is clearly seen on the Western side of S. America where the isotherm of 60° bends to the north, following roughly the line of the **Andes**. (See Map, p. 49.)

3. **Proximity of the Sea.**—The sea tends to lower the temperature in summer and to raise it in winter. Water retains a more constant temperature than land, and thus a place near the sea has a more equable temperature. Auckland, in New Zealand, which is nearly surrounded with water, has a temperature in summer of 67° F., and in winter of 51° F., a difference of only 16° ; while at Irkutsk, in Siberia, the summer temperature is 62° F. and the winter temperature 1° F., showing a difference of 61° .

4. **The prevalent winds and ocean currents** raise or lower the temperature according to the direction from which they come.

A glance at the isotherms of 40° , 30° , 10° (see Map, p. 48) in the North Atlantic shows that these isotherms bend far to the north, the climate being tempered by the warm south-western winds prevalent in this part of the ocean, and also by the influence of the Gulf Stream.

72. **Isothermal Lines.**—These are the lines drawn on maps running through places of equal temperature. If temperature decreased regularly towards the poles, these lines would correspond with the lines of latitude, but an examination of the isotherms will show a very considerable divergence.

Yearly isothermals indicate the average annual temperature. They do not afford a very good indication of the actual climate of a place, as the following example shows: London and New York have a mean annual temperature of about 50° , but New York has a January temperature of 30°

FIG. 41.—ISOTHERMS: JANUARY.

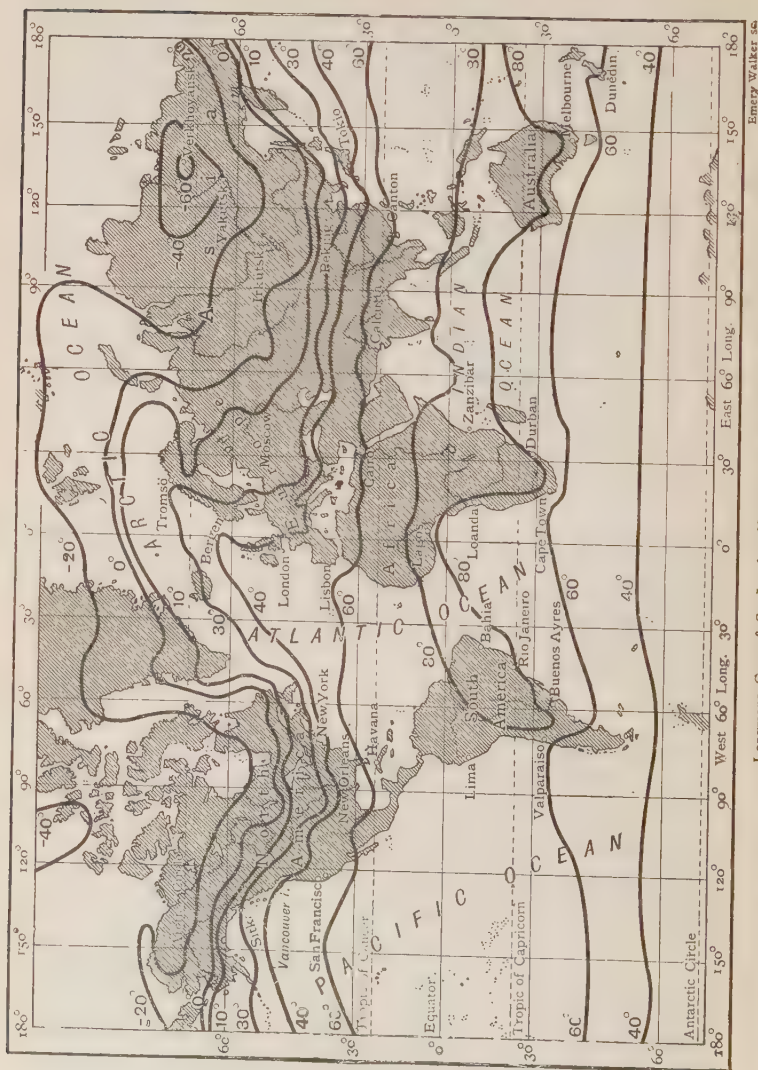
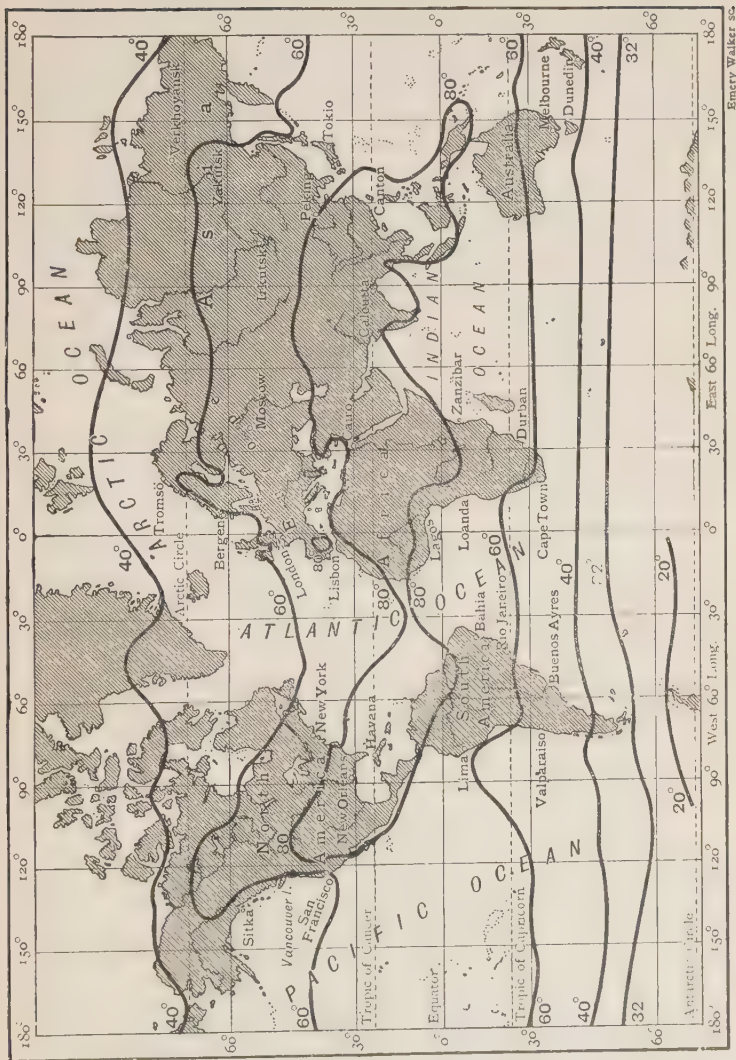


FIG. 42.—ISOTHERMS: JULY.



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and a July temperature of 75° , while London has a January temperature of 39° and a July temperature of 63° ; in one case a difference of 45° , and in the other of 24° , between the winter and the summer temperatures.

The two maps given show lines of average temperature for January and July respectively. Monthly isothermals indicate the temperature better still. The student will find it a very interesting exercise to trace some of the isotherms, and notice the reasons for the great variations visible in some of them. For example, on fig. 41, notice how the influence of the south-westerly winds and the Gulf Stream pushes the isotherms towards the north.

73. MOVEMENTS OF THE ATMOSPHERE.—WINDS.—

Cause.—In the neighbourhood of the Equator there is a broad belt having a mean average temperature of over 70° F. Within this belt the lower layers of air, heated by contact with the earth's surface, expand, become lighter, and cause the layers of air above to overflow towards the poles. The pressure being decreased, the lighter air is forced upwards by the heavier air from the colder regions, which flows in below to take the place of the lighter air which has risen.

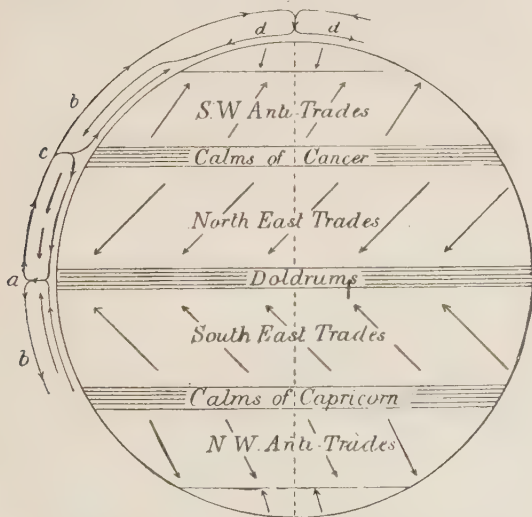
Where the air is warm and rarefied there is less barometric pressure, and where it is colder and denser the pressure is greater; hence there is a constant movement of the air from regions where there is a high barometer to those where the barometer is low.

If the earth did not rotate on its axis we should have constant currents of air flowing north and south. Now the atmosphere moves with the earth. The velocity with which a place on the Equator moves is about 1,000 miles an hour. This velocity diminishes for places nearer the poles. Therefore, currents of air from the polar regions flowing towards the Equator bring with them a smaller velocity than that possessed by places nearer the Equator, and consequently lag behind, and become when north of the Equator **north-east winds**, and when south of the Equator **south-east winds**. In a similar manner the currents of air from the Equator are moving with a greater velocity than those parts of the earth's surface over which they flow, and consequently become **south-west winds** when north of the Equator and **north-west winds** when to the south. We thus come to the same law as in the case of the currents of water—viz. '*That owing to the earth's rotation a body moving on the earth's surface is deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.*'

The lines to the left of fig. 43 indicate the circulation between the Equator and the Poles. The heated air rises at *a* and flows as an upper current towards the poles. At *c* it has become cooler and some of it descends, part returning towards the Equator, while the other part flows towards the poles, causing the variable but prevailing south-west and north-west winds.

74. Constant Winds.—1. **Trade-Winds.**—These winds blow constantly and regularly throughout the year, and have received their name from the help they afforded commerce. The heated and rarefied air of the tropics ascends and flows towards the poles. The cold polar air flows towards the Equator and comes down to the surface about latitude 35° , owing to the indraught caused by the heat of the tropical regions. This polar current, owing to the earth's rotation, is deflected to the right in the Northern Hemisphere, and to the left in the Southern Hemisphere, thus forming the **north-east** and **south-east trade-winds**. The north-east trade-wind ranges between 35° N. and 9° N.; the south-east trade-wind between 1° S. and 30° S. Between the

FIG. 43.—GENERAL MOVEMENTS OF THE ATMOSPHERE.



trade-wind lies the equatorial belt of calms known as the **Doldrums**, where calms alternate with thunderstorms and heavy rains.

2. **Anti-Trade-Winds.**—The warm air from the Equator descends as it becomes cooler, and striking the earth about latitude 35° is deflected to the right in the Northern and to the left in the Southern Hemisphere. Hence between 35° and 65° N. the prevailing winds are **south-west**. The meeting with the polar winds, and the influence of the great land masses, cause these winds to be somewhat variable. In the Southern Hemi-

sphere the **north-west anti-trade winds**, blowing between 30° and 65° S., are not so much affected by the land, and in the Pacific and Indian Oceans between latitudes 40° and 50° they blow so regularly and with such force that they are called 'The Roaring Forties.'

Between the trades and the anti-trades are the Calms of Cancer and Capricorn, where calms alternate with wind. In the North Atlantic these calms are known to sailors as the 'Horse Latitudes.'

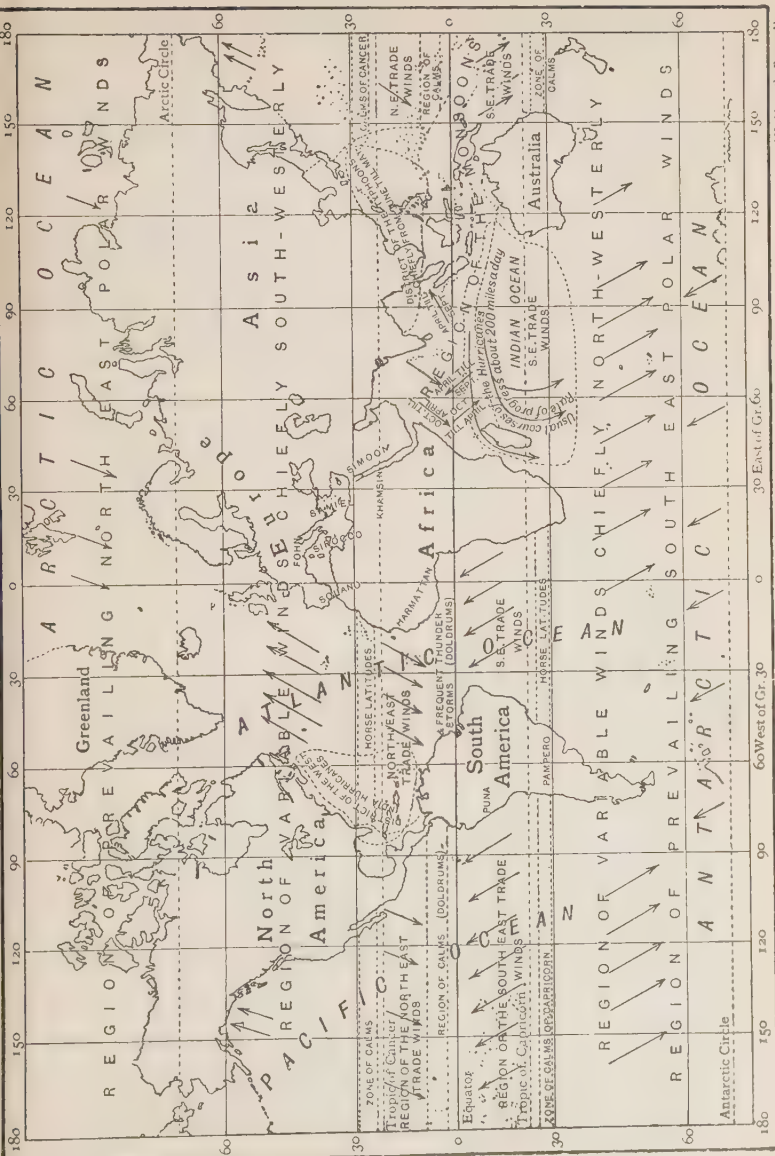
3. Polar Winds.—In the polar regions the winds blow constantly for most of the year as cold, piercing, north-east and south-east winds.

75. Periodical Winds.—**1. Land and Sea Breezes.**—On the sea shore, especially in hot countries, a breeze blows towards the land in the morning and gradually dies away towards sunset. This is the **Sea Breeze**. During the night a breeze blows out to sea from the land. This is called the **Land Breeze**. The reason for this is, that during the day the land becomes more heated than the sea, the air in contact with the land becomes more heated and rarefied and therefore rises, while the cooler and heavier air from the sea flows in to take its place. During the night the land loses its heat more rapidly than the sea, the air in contact with it is rapidly cooled, becomes denser than the air over the water, and consequently flows out to sea as a land breeze.

2. The Monsoons.—These are land and sea breezes blowing not for a day and a night, but from one season to another.

During summer the sun's rays fall more directly upon the great plains of Central and Southern Asia. These plains consequently become greatly heated, and the air in contact with them becomes rarefied and ascends. An indraught sets in towards these heated regions, which is deflected to the right by the earth's rotation. Hence the winds coming from the Indian Ocean blow from the south-west as the **south-west monsoon** (May to October. See Map on p. 380.) This wind is strong enough to entirely destroy the north-east trade wind, and coming from the ocean is saturated with moisture, which is precipitated in enormous quantities on the Western Ghâts, the Khasi Hills, and the Himalayas, creating the great rivers of India, Indo-China, and China.

During winter the great land mass cools, the air becomes denser and flows towards the sea as a land breeze forming the **north-east monsoon** (November to April. See Map on p. 380.) In crossing the Bay of Bengal the north-east monsoon absorbs some moisture, part of which is condensed by the mountains of Ceylon, which thus get two rainy seasons.



At the changing of the monsoons, when the opposing currents meet, violent storms occur, accompanied by an enormous downfall of rain.

Monsoons also occur on the west coast of Central America, the south-east coast of Brazil, the south-west coast of Africa, and on the coasts of Australia, but their extent and influence are very small when compared with the Asiatic monsoons.

76. Local Winds.—Many winds blow with a certain amount of regularity in some districts at fixed seasons of the year, and so receive special names.

During the summer a hot, dry wind blows from the Sahara across the Mediterranean, bringing with it a quantity of fine sand. In Southern Italy this wind is called the **Sirocco**, in Turkey it is known as the **Samiel**, in Spain as the **Solano**, while it reaches the Alps as the **Föhn**. The **Harmattan** blows from the Sahara to the west, while the **Khamsin** is the hot wind of Egypt. Perhaps the most dreaded of all these hot desert winds is the **Simoom** of the Arabian deserts—a sudden, violent, and burning wind, which makes the atmosphere so suffocating that it is almost unbearable. All living things rush for shelter on its approach.

Of cold local winds the chief are: the **Mistral**, a north-west wind blowing over the Gulf of Lions and north-western Italy, the **Bora** from the Alps, and the **Etesian** winds, which blow towards the heated surface of Northern Africa. A strong wind at the eastern end of the Mediterranean is known as a **Levanter**. The **Pampero** is a violent north and north-west wind which sweeps across the pampas of South America. The **Puna** of Peru is an exceedingly dry wind. After its passage over the Andes it is so bereft of moisture that under its action a dead carcase is quickly dried up to a mummy. The ancient Peruvians used the district over which it blows as a burial place for their dead.

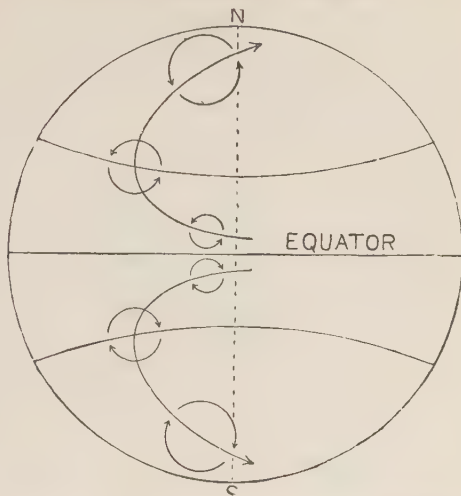
77. OCCASIONAL WINDS.—Storms.—Besides the general circulation of the atmosphere there are other occasional movements when the wind is more violent and moves in a more or less whirling course. These occasional winds are called storms.

Cause.—If a limited part of the earth's surface becomes more heated than the surrounding parts, the air above this part will expand, begin to rise, and spread outwards in all directions. Within this area the pressure on the barometer will be lessened, while outside the pressure will be increased. There will consequently be a rush of air from the outside to this inside area of low pressure. As the air rises it becomes cooler, the moisture it contains is condensed, and a considerable amount of latent heat is set at liberty, causing the ascending current to become more rarefied, and thus increasing the draught. Moist air flows in from all sides, increasing the volume of the ascending current, and thus we have the beginning of a storm.

This area of low pressure, with its accompanying winds, is called a **Cyclone**. Cyclones are never stationary, but move outwards in the direction of the prevalent wind. In the tropics their course is westwards and towards the poles. As the cyclone approaches the Temperate Zone its path is turned eastwards by the anti-trade-winds, and thus its track forms a curve somewhat in the shape of a parabola.

The greater the difference between the height of the barometer within the region of low pressure and the height without, the more violent the storm. In the Northern Hemisphere the direction of the whirling motion of the cyclone is in an opposite direction to the movement of the hands of a clock. In the Southern Hemisphere it is in the same direction as the movement of the hands. Within the low-pressure centre there is a comparative calm. As the cyclone moves towards the poles the low-pressure area spreads and the storm gradually dies away. The area of the low-pressure centre varies from 30 to 1,000 miles.

FIG. 45. MOTION OF A CYCLONE.



A knowledge of this whirling nature of storms is of considerable service to the navigator.

In the Northern Hemisphere he turns his back on the direction from which the wind blows and steers to the right to reach the outside of the storm area. In the Southern Hemisphere he would steer to the left.

Tornadoes last but a short time, but are dreadfully destructive in their action. The path of a tornado very rarely exceeds a quarter of a mile in width, but within that path all is desolation. The force of the whirlwind is so great that buildings and trees are blown down, and heavy objects are often lifted a considerable distance. They are most common in the western part of the United States.

In the West Indies these violent storms are called **hurricanes**. In the China Seas **typhoons**. The southern part of the Indian Ocean is also subject to destructive **hurricanes**.

Waterspouts.—When these violent storms occur at sea, the funnel-shaped cloud which is formed sometimes descends to the surface, and, drawing up the water into a whirling column of spray, forms a waterspout:

In the desert, sand is sometimes caught up by the tornado, forming a **sandspout**.

78. Anti-Cyclones.—Winds not only blow towards regions of low pressure, but also gently outwards from regions of high pressure. These latter are **anti-cyclones**.

Cyclones bring rain, snow, squalls, &c., and move with rapidity and uncertainty. Anti-cyclones bring bright and dry weather and move slowly.

FIG. 47.—A CYCLONIC DISTURBANCE, THE CENTRE OF WHICH LIES OVER WALES.

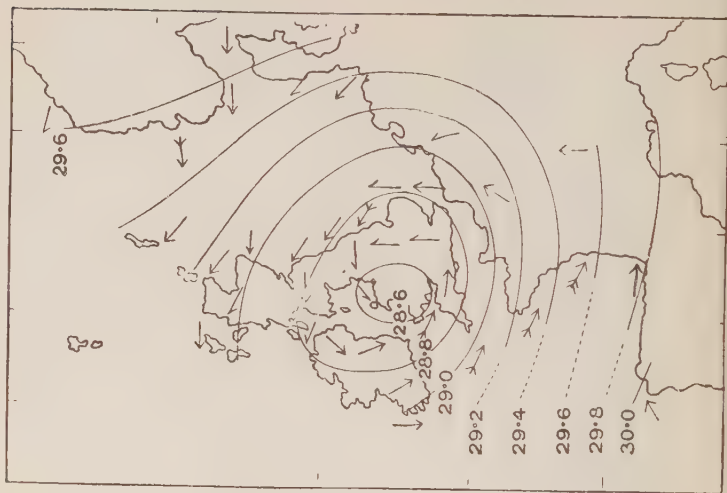
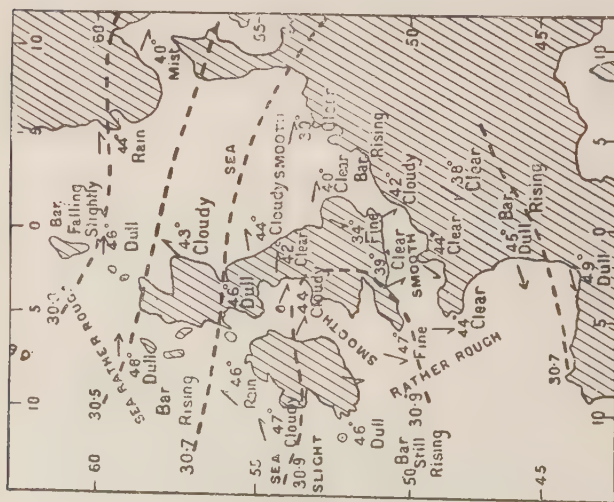


FIG. 46



A 'Times' Weather Chart for one day: a study of the isobars shows an anti-cyclonic system lying over the British Islands.

Local names are given to cyclonic storms of great violence but of small extent.

Weather.—By weather we understand the variations day by day of barometric pressure and of temperature and the direction and force of the wind. As a rule a cyclone brings changeable weather—wind, rain, or snow, but variations in temperature depend mainly upon the direction of the wind. An anti-cyclone which is associated with a high barometer gives settled weather, and in the winter is often a period of severe frost and fog. In the British Islands cyclonic disturbances generally come from the west and bring winds veering south-west to north-west and rain. Fig. 47 shows a cyclonic disturbance, the centre of which lies over Wales, where the barometer pressure is as low as 28.6. A study of the arrows (note the more barbs upon an arrow the greater the strength of the wind) shows the force and direction of the wind. The isobars on the west side of the cyclonic area show that the glass is rising in the west and that the disturbance is travelling in a north-easterly direction. Generally speaking it may be said that a rapid fall in the height of the barometer means the approach of disturbed weather, whereas a steady rise means fine weather. Occasionally a rising glass with a north-easterly wind means rain.

79. MOISTURE OF THE ATMOSPHERE.—**Dew.**—At night the earth cools rapidly, and the surface becomes colder than the air above it. This causes the air to deposit its vapour on the cooled surface, and possibly vapour also rises from the moist soil below and becomes condensed. If the temperature falls below 32° F., the moisture deposited freezes as **hoar-frost** or **rime**. More dew is deposited on clear nights, as clouds check the radiation of heat from the earth's surface.

Fogs and Mist.—When a warm and moist current of air comes into contact with cold water or with cold air, and the aqueous vapour is condensed into minute visible particles of water, which remain in the air near the surface of the earth, a fog is formed. A **mist** is similar to a fog, but consists of slightly larger particles of moisture.

Clouds are fogs or mists formed at an elevation. When they are at a great height they may be formed of small particles of ice.

80. RAIN is the condensation of the aqueous vapours of the air, so that minute particles unite and form drops which fall through the action of gravity. Where there is much condensation of vapour, latent heat is given off and the temperature rises. Hence a rainy climate is never very cold.

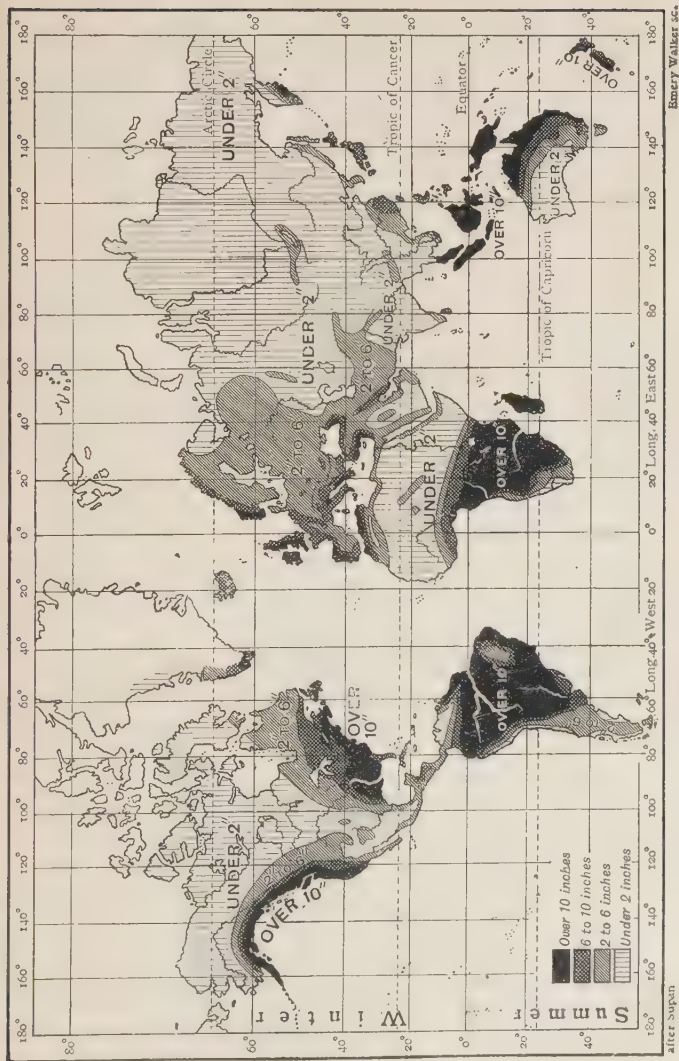
The amount of rainfall at any place chiefly depends upon the following circumstances:—

1. The Direction of the Prevalent Winds.—If a wind blows from a cool to a warm region, the increase of temperature decreases the humidity of the wind and little rain falls. Hence the trade-wind districts have a very slight rainfall. Where, however, the conditions are reversed, and winds blow from warm to cool regions, the decrease in temperature causes condensation, and

FIG. 48.—THE WORLD: Rainfall June to August. Summer in Northern Hemisphere.



FIG. 49.—THE WORLD: Rainfall December to February. Winter in Northern Hemisphere



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after Japan

Emery Walker sc.

much rain occurs. The anti-trade-winds blowing from hot to colder regions bring copious rains to the districts over which they pass.

2. **Land Masses, especially Mountains, act as Condensers.** The moisture brought by the south-west monsoon is first condensed by the Western Ghâts; near Bombay the annual rainfall is 260 inches. On the Khasi Hills, which rise abruptly from the plain of the Ganges, the fall is as much as 500 inches. After passing over the Himálayas the monsoon is so completely robbed of its moisture that it reaches the northern side as a dry wind, causing the great deserts of Northern China. The warm south-west wind which strikes the hills of Ireland, Scotland, and Norway, brings heavy rains to the western sides of those countries.

3. **Forests check Evaporation, and by cooling the Air above them act as Condensers.**—The great forest plains of the Amazon are districts of heavy rainfall. See maps on pp. 58, 59. In many districts, where the land has been cleared of trees, a diminution in the rainfall has occurred.

81. **Regions of Deficient Rainfall.**—The deserts of Sahara, Arabia, and Persia, lie within the district of the dry north-east trade-wind, which has been deprived of its moisture before reaching these parts. The Himálayas, as has already been mentioned, prevent the desert of Gobi from receiving moisture from the south-west monsoon, while the mountain ranges lying on its northern side arrest the moisture brought by winds from that direction. The Kalahari Desert of Southern Africa, the desert of Atacama on the west of the Andes, and the great Salt Lake district in North America, are due to similar causes.

Snow.—When the temperature of the air falls below freezing point, clouds within it are frozen into crystals of ice of a regular form, generally more or less hexagonal in shape.

82. **CLIMATE.**—This is the condition of a place with regard to the temperature, moisture, and other phenomena of the atmosphere, especially as they affect animal and vegetable life. The climate of a place chiefly depends upon—

1. **Latitude.**—Temperature largely depends upon latitude; the greatest amount of heat is received by the regions near the Equator, where the sun's rays strike the surface of the earth more nearly at right angles.

2. **Elevation.**—There is less heat radiated from the earth's surface to the air in elevated regions. This air is also more rarefied, and therefore cannot receive so much heat, while it contains less watery vapour, which tends to check radiation.

3. **Proximity to the Sea.**—In winter the warm winds which blow from the sea raise the temperature of the land, while in summer the cool winds from the sea moderate the heat. This is seen in a marked manner on the maps on pages 48 and 49. The isotherms for January rise towards the sea and fall towards the land, while those for July sink towards the sea and rise towards the land, thus showing that the sea raises the temperature of a place in winter and lowers it in summer.

This gives rise to two classes of climate. Those places which exhibit a great difference between the summer and the winter temperature are said to

have a **continental climate**, while those which have a more equable temperature through their proximity to the sea are said to have an **insular climate**.

4. The Direction of the Prevalent Winds. Warm and moist winds carry their warmth and moisture to the lands they blow upon. The south-west winds of the North Atlantic raise the temperature and bring copious rains to North-Western Europe. In a similar manner the south-west monsoon carries its moisture to India and Indo-China. See map on p. 58.

5. The Character and Direction of the nearest Ocean Currents.—The effect of warm currents like the Gulf Stream and the Kuro Siwa in raising, and of cold currents like the Labrador Current and the Peruvian Current in lowering the temperature, has already been pointed out.

6. The Direction of Mountain Chains. -In some cases mountain ranges intercept warm moisture-laden winds, causing a heavy rainfall on the windward, and comparative dryness on the other side of the range. The western side of the Pennines has in some places an annual rainfall of 80 inches, while on the eastern side it falls to 30 inches. See map on p. 107. Bergen, on the windward side of the Scandinavian Range, has an annual rainfall of 82 inches, while Stockholm, on the opposite side, has only 16 inches. Compare also the excessive rainfall on the southern side of the Himalayas with the extreme dryness of the regions to the north. See map on p. 381. The rainy side of a range always has a higher mean annual temperature than the dry side. In other cases mountain ranges act as screens against cold blasts. In this way the Alps shelter Northern Italy from the cold north winds that blow from the northern plain of Europe.

7. The Slope of the Land.—The southern slopes of the Alps receive the sun's rays almost as vertically as regions near the tropics, while on the northern side the rays strike the land much more obliquely, and consequently give less heat.

8. Cultivation.—The climate of England is much drier and colder now than in years gone by, when the country was largely covered with forests.

83. DISTRIBUTION OF PLANTS.—The distribution of plants chiefly depends upon temperature, moisture received, and the nature of the soil. In parts of the tropics where the temperature is the highest and the moisture greatest, the vegetation is most luxuriant, as for example the valley of the Amazon and some of the districts under the influence of the monsoon. Temperature is largely regulated by latitude and altitude. The ascent of a high mountain in the tropics shows similar changes in the character of the vegetation to those which may be observed

in a journey from the Equator to the poles. The changes in the character of the vegetation do not necessarily follow the lines of latitude, but the lines of equal temperature (isotherms).

84. ZONES OF VEGETATION.—Humboldt was the first to suggest the division of the distance between the Equator and each pole into eight plant zones separated by isothermal lines.

1. **The Equatorial Zone**, lying between the isotherms of 80° north and south of the Equator. Here in the moister and warmer parts the vegetation is most luxuriant, palms and bananas being the typical plants. Other important plants are the mahogany of America, the silk-cotton tree of Brazil and Africa, the banyan of India, the baobab of Africa, orchids, the *Victoria Regia* lily of the Amazon, whose leaves are six feet across and the flower of which has a diameter of two feet, and enormous climbing plants.

2. **The Tropical Zones**, extending to the tropics. The vegetation resembles that of the equatorial, but is not so luxuriant. Figs, tree ferns, cotton, coffee, sugar-cane, bread-fruit, pine-apple, cactus, and plants of the equatorial region are widely spread.

3. **The Sub-tropical Zones** reach to about lat. 34° . Laurels, myrtles, magnolias, the bamboo, and roses are typical plants.

4. **The Warm-Temperate Zones** extend to about lat. 45° . The principal plants are the cork-oak, beech, chestnut, evergreens, tree-ferns, the orange, pomegranate, olive, peach, vine, tea-plant, &c.

5. **The Cold Temperate Zone** extends to about lat. 58° . Coniferous trees, such as pines, firs, &c., many deciduous trees, grasses, the hop, and wheat, are characteristic plants.

6. **The Sub-Arctic Zone** reaches the Arctic Circle. The principal plants are grasses, coniferous trees, birches, and willows.

7. **The Arctic Zone** contains dwarf shrubs, rhododendrons, saxifrages, lichens, and bog-mosses.

8. **The Polar Zone** lies around the North and South Poles. There are no trees, and the vegetation chiefly consists of mosses and Alpine plants.

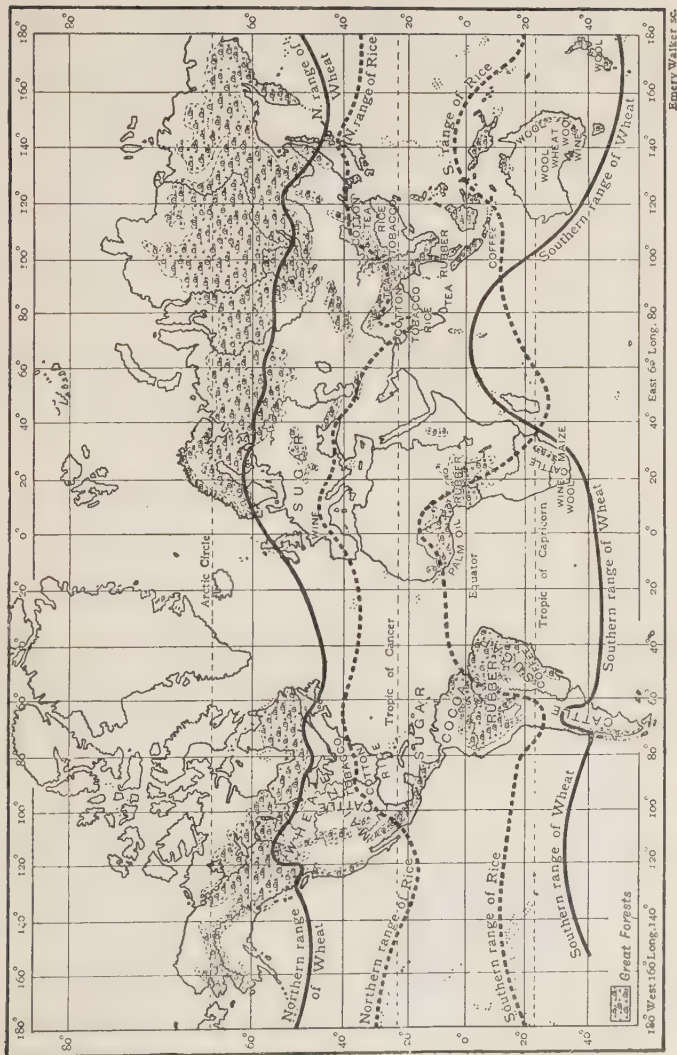
85. DISTRIBUTION IN ALTITUDE.—From the sea level to the top of a high mountain in the tropics corresponding zones of vegetation would be passed through—the Equatorial, extending to a height of 2,000 ft.; the Tropical, from 2,000 to 4,000 ft.; the Sub-Tropical, from 4,000 to 6,000 ft.; the Warm Temperate, from 6,000 to 8,000 ft.; the Cold Temperate, from 8,000 to 10,000 ft.; the Sub-Arctic, from 10,000 to 11,500 ft.; the Arctic, from 11,500 to 13,500 ft.; the Polar, from 13,500 to 15,500 ft.

This division is not by any means arbitrary, many differences existing in different parts. In addition to these arrangements of plants according to latitude and altitude, they are also grouped in provinces, different countries having their own special plants.

86. Man acts as a great distributor of plants, many being now cultivated far from their original home. Maize, for example, has spread from America to most warm parts of the world; wheat has been introduced into Australia since its colonisation. Frequently the plants introduced into other countries thrive so well that they overrun and displace other species. The thistle introduced into South America now renders the Pampas in some parts quite impassable.

Of the plants whose products are useful to man we may mention—**Food plants**, cereals, bulbs and tubers, edible fruits, edible stems, leaves, &c.;

FIG. 50.—THE WORLD: Products and Forest Lands.



those yielding sap for sugar and those used in making beverages, as tea, coffee, cocoa, &c.; plants yielding fibrous substances, such as cotton, flax, hemp, jute; timber trees; medicinal plants, such as the cinchona, from which quinine is obtained; plants yielding oils, gums, resins, &c., such as caoutchouc, resin, gum-arabic, palm-oil, linseed oil, castor oil, &c.; dye plants, such as indigo, logwood, madder; narcotic plants, yielding tobacco and opium; spice plants, furnishing nutmeg, allspice, cinnamon, cloves, and pepper. See map on p. 63.

87. DISTRIBUTION OF ANIMALS.—Temperature, elevation, and character of the land play an important part in regulating the distribution of animals. Hence they may be arranged in a number of provinces each with its characteristic forms of animal life. As a rule, the number and species of mammals are most numerous in tropical countries, and decrease towards the poles.

In certain cases, seas and mountain chains prevent migration. The animals of Madagascar are quite distinct from those of the neighbouring continent of Africa. The deep channel between New Guinea and the other East Indian Islands separates very different species of animals; on one side they are Australian, on the other Asiatic. Pelagic islands have very few, if any, large native quadrupeds. New Zealand before it was visited by Europeans had no large mammals and only one or two small ones.

88.—DISTRIBUTION OF MANKIND ON THE GLOBE.—The distribution of mankind upon the globe depends upon physical conditions. Fertility of soil, climate, position as regards the equator, rainfall, and other circumstances, combine to render an area fit for the home of a great people. In the course of ages great changes have taken place in the physical conditions of the earth's surface, and areas that once supported large populations have deteriorated. Thus, the lands that were the home of the Assyrians are now mostly desert; and the fertile area of the Nile valley, that in ancient times supported teeming millions, has been so much encroached upon by the desert that only a narrow strip along each side of the river can be cultivated.

There are great stretches that barely support one person per square mile, there are other regions where more than a hundred to the square mile are to be found. The chief physical conditions that render any area capable of supporting a dense population are :—

1. Its position upon the globe as regards distance from the equator. In the extreme North of America and Asia the sun shines for only six months, and there follows an equally long Arctic night. Land and water are frozen. There is little vegetation, without which animal life is impossible. Hence in these vast tracts there are to be found only a few wandering Eskimos in America and Samoyedes in Asia, who build their homes of

frozen snow, and move from place to place in search of animals that may be found upon the ice or upon the frozen tundras of the far north.

2. Climate.—The great land hemisphere lies round the North Pole, and a considerable part is within the North Temperate Zone, where there are no great extremes of heat and cold ; where there is an abundance of fertile soil and a plentiful rainfall—conditions all in favour of the growth of food plants, grasses, and trees—and an equable climate in which it is possible for man to work all the year round. The Northern shores of the Mediterranean and the plains and uplands of Western and Central Europe, the valley of the Ganges, the coast lands of China, have been thickly peopled for centuries.

3. Relief of the Land.—In regions of lofty mountains and elevated plateaux, the extremes of heat and cold and the want of fertile soil make large food-crops impossible, and such districts are the home of people who are widely scattered. Thus in the Himalayan region, upon the plateau of Tibet, along the deep valleys of the Andes, only a scanty population is to be found.

4. Fertility of the Soil and Rainfall.—Fertile soil is generally found in river valleys or in plains that have in the course of ages been formed by the constant action of rain and streams washing down the finer soil from higher regions. In some parts of the earth vast areas of fertile soil are associated with an abundant rainfall and a warm or temperate climate—just the conditions for producing rapid growth of vegetation, and it is such regions that can best support large numbers of people, as well as the animals that are useful for food and work. In India, Burma, Indo-China, and China, the south-west monsoon brings an abundant rainfall over great areas of fertile river valleys, and causes a rich growth of vegetable foods.

The Himalayas form a barrier to the south-west rain-bearing winds, and north of this mountain region lie the desert lands of Tibet and China. The great central belt of high plateau across Central Africa is well watered by tropical rains, and the conditions are favourable to rich vegetation. Hence this region is thickly peopled, and supports vast numbers of both wild and domestic animals. But in Northern Africa, where the prevailing winds are from the North and East, and where the rain-bearing winds from the Atlantic do not penetrate, there is a vast area of sandy desert (the Sahara) capable of supporting only a few tribes of wandering Arabs.

In Central, Southern, and Western Europe the climate is temperate : there is plenty of fertile soil in the river valleys and

lowland plains, and an abundant rainfall - conditions all in favour of the growth of food and other plants, and across this part of the continent is to be found a dense population, ranging from over 600 to the square mile in England and Wales, about 700 to the square mile in Belgium, and over a thousand to the square mile in Saxony.

North America shows great variations. The far north is frozen for a large part of the year ; but across the centre of the continent, from the Atlantic to the Rocky Mountains, there are vast areas of prairie and rolling country, intersected by noble rivers, such as the Mississippi and the Missouri and the numberless rivers that flow into the Great Lakes, into Hudson Bay or to the Arctic Ocean, where a fertile soil and an equable climate combine to render the country suitable for the production of wheat and maize in the central zone, and sugar and cotton in the southern. There are also large areas of grass lands, where immense herds of cattle are fed.

South America is in some ways similar to North America. It has a long range of lofty mountains along its western side, and mighty rivers flow to the east and south. But it lies more within the tropics, and its northern area is elevated and covered with dense forests. Farther south are the plains of Argentina, where the conditions are favourable to both vegetable and animal life.

The greater part of Central Australia has a very small rainfall (see maps on pp. 58 and 59), and only the eastern and southern regions have sufficient for vegetable growth. There are only small areas in the whole continent suitable for the home of a large population.

Mankind is generally divided into three types, classified according to colour, as **Black** or Negro, **Yellow** or Mongolian, **White** or Caucasian.

1. **The Black Type** originally inhabited hot countries, and is distinguished by black woolly hair, dark complexion, a broad, flattened nose, thick projecting lips and jaws, and prominent eyes with a yellowish cornea. 175,000,000.

The chief divisions are the **African**, inhabiting the whole of Africa south of the Sahara, and the **Australasian**, occupying Australia, New Guinea, and the islands comprised in Melanesia.

2. **The Yellow Type** is the most widely distributed of the three types. The characteristic features are straight, coarse, black hair, a light yellow complexion varying from olive to brown, prominent cheekbones, small black eyes, rather sunken and slightly oblique. 520,000,000.

It is divided into three principal divisions :—

(a) **The Mongolian**, including the Mongol-Tartars of Central and Northern Asia, Russia, and Turkey ; the Chinese, Burmese, Siamese, Japanese, and Esquimaux ; the Finns, Lapps, and Samoyedes of Northern Europe and the Magyars of Hungary.



Longmans & Co. London & New York.

(b) **The Malayo-Polynesians**, including the Malays, the inhabitants of the Pacific Islands, the Maoris of New Zealand, and the Hovas of Madagascar.

(c) **The American Indians**, comprising the aboriginal inhabitants of America from the Arctic regions to Cape Horn. 20,000,000 not included in Yellow Type.

3. **The White Type** embraces the most highly civilised and enterprising peoples of the world. The distinctive features are straight or curly hair, white complexion, which in some places merges into olive, dark brown, or even black, prominent nose, and regular features. It is divided into two sections, **light and dark**. Some of the dark races are as dark as Negroes, but differ from them in hair, features, language, &c. The chief light races (770,000,000) are :—

(a) **The Teutonic**, inhabiting England and her colonies, North-eastern Europe, and the United States, Germany, Scandinavia, Denmark, and Holland.

(b) **The Slav**, inhabiting Russia, Poland, Bulgaria, and Servia.

(c) **The Caucasian**, which includes the Circassians, Georgians, Afghans, and the Berbers of North Africa.

The chief dark races are :—

(a) **The Romanic**, including the people of Southern Europe.

(b) **The Semitic** includes Arabs, Syrians, and Jews.

(c) **The Hamitic** includes Egyptians, Libyans, Numidians, the Copts, the Kabyles, the Somali, and Gallas.

(d) **The Asiatic Aryans** comprise the Hindus, Persians, Armenians, Baluchis, Kurds, and Parsees.

EXAMINATION PAPERS

- A. 1. What is a barometer ? Explain its structure and uses.
2. How may the barometer and the thermometer be used to measure the height of a mountain ?
3. What circumstances affect the temperature of the atmosphere ?
4. Explain the general causes of atmospheric circulation.
- B. 1. Explain why the trade-winds blow in the way they do.
2. How are periodic winds caused, and how are they modified by local circumstances ?
3. What are cyclones and anti-cyclones, and how do they originate ?
4. What are the anti-trade-winds, and over what districts is their influence felt ?
- C. 1. What are the following, and where do they occur :—Simoom, harmattan, bora, sirocco, Föhn, pampero ?
2. How are tornadoes, typhoons, and hurricanes caused, and in what districts are they prevalent ?
3. Explain how dew and rime are formed.
4. Show how proximity to the sea and the direction of the mountain chains affect the climate of a country.
- D. 1. What are the chief causes of the difference between the climates of Lisbon and Moscow ?
2. What are isothermal lines ? Give some account of the climate experienced in London and Irkutsk.
3. State the circumstances which affect the rainfall of a district.
4. Where are the Khasi Hills, and what circumstances would you associate with them ?

- E. 1. In summer in the Northern Hemisphere the isotherm of 60° reaches the Arctic Circle in North America, but the same isotherm passes through the English Midlands (see map, p. 49). Why is it so much hotter in North America at this time of year than it is in London?
2. Explain why in winter New York, that is so much further south, has a climate similar to the northern coast of Norway (see map, p. 48).
3. If we follow the January isotherm of 60° in the Northern and Southern Hemispheres it will be seen that the line is more curved and stretches farther from the equator in the Northern than in the Southern Hemisphere. Account for these differences in North America, Western Europe, and Eastern Asia.
4. What are the physical conditions that cause the small rainfall in Northern Africa?
- F. 1. What are the chief arid regions of the globe, and why are they so?
2. What are the principal circumstances which regulate the distribution of plants?
3. What are zones of vegetation, and what determines their limits?
4. Explain how vegetation varies in the ascent of a high mountain in the tropics.
- G. 1. How has the agency of man affected the fauna and flora of certain districts?
2. Classify plants according to their uses, and mention typical examples.
3. What are the characteristic features of the three great types of mankind?
4. Where are the following found, and to what type do they belong :—Maoris, Kaffirs, Afghans, Kabyles, Turks, Circassians, Papuans, Finns, Patagonians?
- H. 1. From a study of the map on p. 63 make a list of the great food products of the world and say where they grow most abundantly.
2. What are the conditions that have led to a dense population in India and along the coast of China?
3. What are the chief plants used in manufactures and where are they grown?
4. What are the most thinly peopled parts of Asia, Africa and Australia, and why is there so small a number of people to the square mile in these regions?
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MAP-MAKING : 1. PROJECTIONS

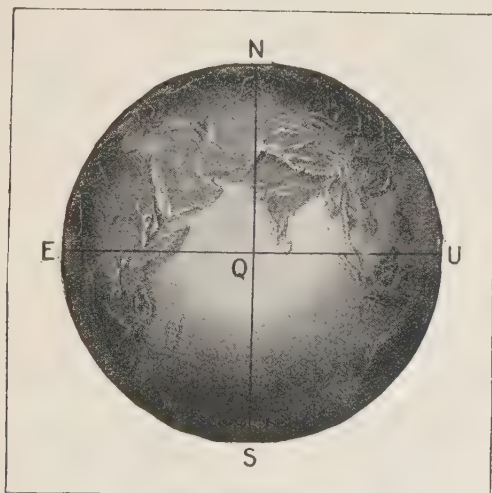
So far we have dealt with the position of places as they appear upon a globe which is an exact model of the earth (on a very small scale) and upon which are marked the positions of continents, countries, oceans, seas, lakes, mountains, rivers, cities, &c. The ordinary model globe is so small that there is no space to show anything but the most important features of the earth's surface. But it is necessary to have some other means of representation by which the smallest detail can be shown, and for this purpose maps have been constructed on flat surfaces that can easily be rolled up and carried about. A moment's thought will show that the preparation of an accurate map is not an easy matter, for the earth's surface is curved and maps are flat. Take a piece of paper and spread it over a portion of the globe. It cannot be made to lie evenly, and the larger the section of the globe to be covered the more the paper will have to be crumpled in the effort to make the two surfaces coincide. The earth is so large that a small portion of its surface, such as a town or district, can be faithfully represented on a flat map ; but, as in the case of the model globe, the larger the area to be represented the greater the inaccuracy becomes.

The ordinary method of obtaining a picture of an object is by taking a photograph. Is it not possible to obtain maps by photographing a model globe? Let fig. 52 be a photograph of the surface of one hemisphere. The semicircles ENU and ESU represent the half-circumferences of the globe passing through the North and South Poles, and terminated each way by the Equator. The straight lines EQU and NQS also represent half-circumferences, EQU being half the Equator and NQS a meridian of longitude. If we assume the globe to be a sphere, these four lines should be of equal length, but EQU and NQS are obviously much shorter than ENU and ESU , and as a map the figure is therefore inaccurate. That part of the photograph in the neighbourhood of Q is more or less in proportion, but as we proceed outwards to the circumference of the circle the map becomes more and more distorted.

This photographic map illustrates the two chief forms of inaccuracy which the map-maker has to endeavour to overcome. These relate to (a) **distance**, and (b) **direction**. We have seen that the areas on the outside are relatively smaller than those nearer the centre ; in other words, that distances are not represented on a uniform scale all over the map, and the inaccuracy

as regards direction will be readily seen when it is remembered that on the globe lines of latitude and longitude cross each other at right angles.

FIG. 52



PROJECTION.—Before proceeding to the methods by which these inaccuracies are corrected, let us consider the general principle underlying the representation of a curved surface on a flat surface or plane. Suppose we take a hollow glass sphere with the surface features of the earth painted upon it in black, and place a bright light at the centre and a screen at some distance. The shadow of the black lines at *A B C* will appear on the screen, but it is evident that from the centre of the screen to its edges the outlines will be gradually exaggerated. *D* does not appear at all upon the screen and the distance from *b* to *c* is much greater than from *a* to *b*, though *A B C* are equidistant on the sphere. With the light in this position it is impossible to produce a map of a complete hemisphere, for the rays passing through the circle bounding the hemisphere will be parallel to the screen, and will therefore never meet it. This experiment is a simple illustration of the method used in map construction, viz. the throwing forward of the features of the globe on to the flat surface of the screen. This 'throwing forward' is called **projection**. Different methods of projection are employed accord-

ing to the size of the area to be represented, and the particular kind of inaccuracy to be corrected.

Screen FIG. 53.

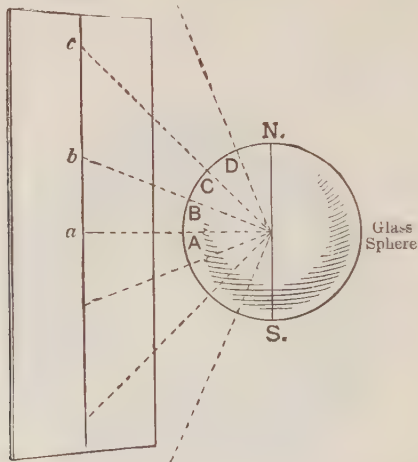
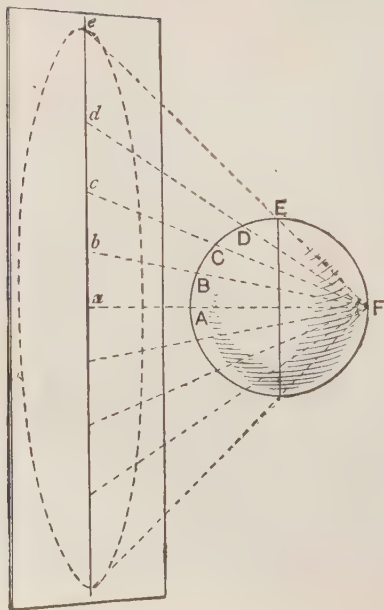


FIG. 54.



(1) **Stereographic Projection.**—In the above experiment the light was placed in such a position that the whole of the surface of a hemisphere could not be projected on to the screen. Let us suppose the light drawn back to the position F. The rays passing through the circle bounding the hemisphere can now reach the screen, but there is still exaggeration as the outside of the map is reached, for while the sections from A to E on the globe are equal, the corresponding sections *a* to *e* on the screen gradually increase in length from *a* to *e*. The central part of such a map is, however, sufficiently correct to be of value, and it is important to

note that, although distances are not quite accurately represented, lines drawn on the globe are so projected on to the map that they cut at the same angle, and direction is therefore correctly shown. This projection—the **Stereographic**—is usefully employed in representing the central portion of a hemisphere, *e.g.*, the Polar regions.

The annexed map of the Eastern hemisphere represents the network of meridians and parallels obtained in the stereographic representation of this half of the globe, the complete map being bounded by a circle. It shows also how the meshes thus formed increase in size as we pass from the centre

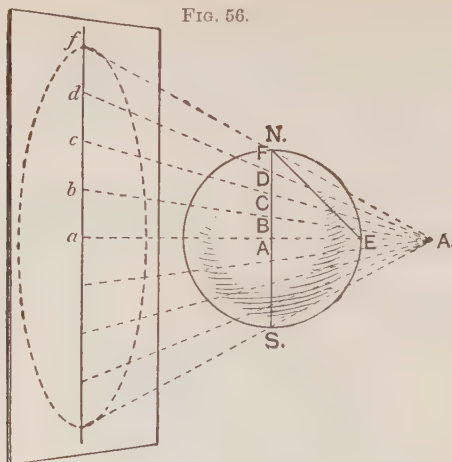
FIG. 55.—THE EASTERN HEMISPHERE ON THE STEREOGRAPHIC PROJECTION. (From Longmans' New Atlas.)



to the outside, although each mesh in the same latitude really represents an equal area on the globe. The outside countries and seas are thus distorted, both in size and shape, though the middle of the map suffers but little distortion. But the lines cutting one another on the globe cut one another at the same angle on the map, and hence the stereographic projection is an **equiangular** projection.

(2) **Globular Projection.**—The most accurate projection of the hemisphere on to a flat surface is obtained by imagining the light drawn still further back to a position *A* such that *AE* is equal to half of *EN*, that is, half the chord of the quarter-circumference. It will be observed that equal distances *ABCD* on the globe are now projected as almost equal distances on the map at *abcd*. The outer portions of the map are still somewhat distorted, but this projection is nevertheless the most satisfactory for representing the world in hemispheres.

FIG. 56.



Modifications of the Globular and Stereographic projections are prepared by the help of mathematical calculation, so as to

FIG. 57.—THE EASTERN HEMISPHERE ON THE GLOBULAR OR EQUIDISTANT PROJECTION. (From Longmans' New Atlas.)



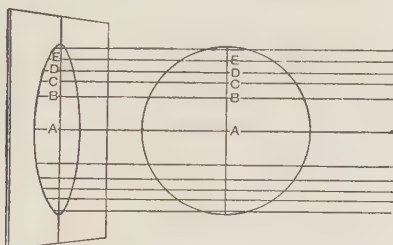
It will be seen that on this map the land has not quite the same shape as on the globe, but it is not so much distorted as upon the map produced by stereographic projection (fig. 55).

represent equal areas on the globe by equal areas on the map. Such projections are called **Equal-area** projections, and while

they have the advantage of being accurate as to distance, they possess the disadvantage of showing direction incorrectly.

(3) **Orthographic Projection.**—In the above examples we have seen that when the light was at the centre of the globe there was great exaggeration towards the edges of the map, and that as the light was drawn back this exaggeration gradually decreased until the position A was reached, at which a maximum of accuracy was obtained. If the light be drawn still further back, the map again becomes out of proportion, but the edges are now diminished as compared with the centre. Let us imagine

FIG. 58.—ORTHOGRAPHIC PROJECTION.

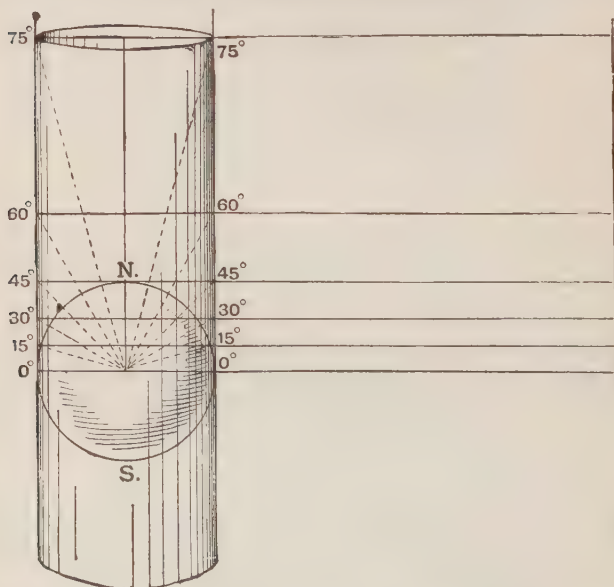


the light to be withdrawn to an infinite distance—*e.g.* the light of the Sun. The rays may now be considered parallel, and the projection is as in fig. 58. This is called **Orthographic Projection**, and it is employed in producing maps requiring accuracy in the central portion.

(4) **Cylindrical Projection.**—Instead of placing a screen at some distance, let us suppose it to be wrapped round the globe in the form of a cylinder, so that the axis of the globe passing through the North and South Poles coincides with the axis of the cylinder, and the two surfaces touch along the line of the Equator. If we now imagine a light placed at the centre of the globe, the surface features will be projected on to the inner surface of the cylinder. If the cylinder be now unwrapped we shall have nearly all the surface features on one sheet, but it will be seen at a glance that the map will be more and more distorted towards the poles; 15° from the Equator take up much less space on the map than 15 degrees between 60° and 75°. (It is evident that the North and South Poles can never be represented on this projection, as the rays passing through these points will be parallel to the sides of the cylinder.) On this map the Equator is the only line which is accurately represented. The lines of longitude are too long, and the lines of latitude are all

shown equal in length instead of becoming shorter as the Poles are approached; moreover, the distance between them increases enormously from the Equator outwards. As regards distance, then, this projection is altogether inaccurate, but it has the great advantage of showing direction with absolute accuracy—*i.e.* lines running North and South are at right angles to those East and West. This accuracy of direction makes the map produced on a **Cylindrical Projection** of great use to sailors, and a modification

FIG. 59.—CYLINDRICAL PROJECTION.

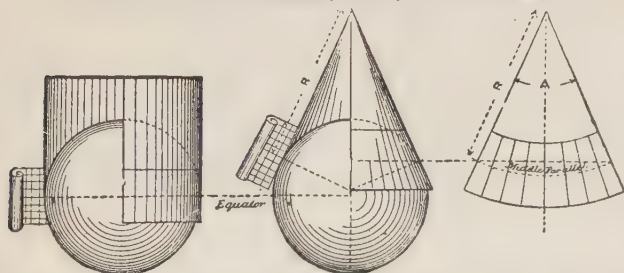


of it, called **Mercator's Projection**, is in universal use on ships. The map on page 67 is on Mercator's Projection.

(5) **Conical Projection**.—The projection mostly used for maps of the continents and *separate countries* is the conical projection, because it represents these smaller areas with the least distortion of parts. Imagine a cone touching the earth on the circle of latitude which passes through the middle of the country required to be drawn. Project from the centre of the globe the lines and parts to be included on the map to the inner surface of the enveloping cone. Now divide the cone along two meridians that include the country to be represented, and spread out the surface flat. It will then be noticed that (1) the meridians or lines of

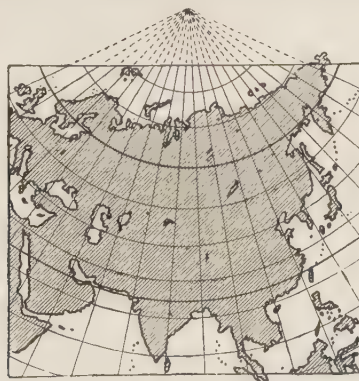
longitude are straight lines converging towards the north in the Northern Hemisphere, or towards the south in the Southern

FIG. 60.—Illustrating the Cylindrical and Conical Projections and Developments.
(From Gribble's Preliminary Survey and Estimates.)



Hemisphere, as the meridian circles do on the globe ; (2) that the lines of latitude are arcs of circles with the apex of the cone as centre. As already remarked, the cone should touch the sphere

FIG. 61.—MAP OF ASIA ON THE CONICAL PROJECTION
(MERIDIANS CONTINUED TO APEX OF CONE). (From Longmans' New Atlas.)



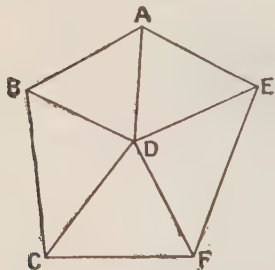
about the middle latitude of the country to be represented. England, therefore, is best represented by a cone touching the sphere at lat. 53° N. In a map of the British Isles the middle latitude is about 55° N. For a map of Asia as represented in fig. 61 a good parallel is 40° N., as the exaggerations and distortions are then thrown upon the less important north of Siberia and the seas of the south. In the case of a map of a smaller area, like England or the British Isles, the lines of latitude are more nearly straight, and the lines of longitude more nearly parallel, than in a large area like Asia. See Map, p. 124.

The great advantage of the conical method of projection is that there is no distortion at the edges of the map, as each mesh of the network obtained is exactly of the same shape between the same latitudes. Various slight modifications of the method are sometimes used in order to increase the accuracy of the representation obtained by it.

NOTE.—It must be borne in mind that in the above examples, only the *method* of projection has been illustrated. The globe and light are not actually used in map-making, but the relative positions of lines of latitude and longitude are obtained by mathematical calculations. It should also be remembered that the only absolutely accurate map is that drawn on a curved surface—the various projections being employed to remove one or other of various inaccuracies, no one projection being capable of removing them all.

MAP-MAKING : 2. BY ACTUAL MEASUREMENT.—Before the globe can be used for making projections, it is evident that the surface features of the Earth must be faithfully represented upon it, and this can only be done by actual measurement on the Earth's surface. One method of measurement, by the determination of latitude and longitude, has been explained on pp. 9 to 12. A second method is by **surveying**, and so important

FIG. 62.



is this method that in most countries a Government Department makes this its sole work. A simple illustration will show how the work is done. Let us suppose we wish to map an open piece of country, $ABCDEF$ (fig. 62), in which six trees, A, B, C, D, E, F, are easily visible. The first thing to do is to measure very carefully a **base-line**—say the distance between A and B. Then by means of an instrument

called a **theodolite** the angles ABD and BAD are measured. Now we know by trigonometry that if one side and two angles of a triangle be given, the remaining sides and angle can be easily found; so, having ascertained the length of AB and the measurement of the angles ABD and BAD , we have sufficient data to map the triangle ABD . The same process may now be repeated with the other triangles, except that it will be unnecessary to measure a second base-line, the lengths of new base lines, *e.g.* BD and AD , being ascertained by calculation for each new triangle. This method of measurement is called **triangulation**, because the basis of all calculations is the triangle.

In putting this method into practice the chief difficulty is the selection of suitable stations. As in the above instance, they

must be prominent objects, *e.g.* mountains, such that the third can be accurately observed from each of the other two, and they must be easily accessible, so that the instruments can be carried there for new observations. In this way the whole of a country can be mapped into triangles and measured. The instruments employed are so delicate, and the observations so carefully made, that the error only amounts to a few inches in many miles. It should be noticed that the two methods of measurement—triangulation and the determination of latitude and longitude, can be made to check each other.

REPRESENTATION OF ELEVATION.—By the above means we are only able to mark *position* on a map, that is to say, we can put towns in their proper places, and mark the direction of roads, rivers, mountain ranges, boundaries, &c., but they do not help us in showing the irregularities on the earth's surface—the heights of hills, mountains, and plateaux, and the depths of lakes, seas, and oceans. How are these heights and depths measured, and how are they represented on the map?

The process of finding the depth of water is called **sounding**, and consists in sinking a heavy weight, generally of lead, and noting the amount of line run out before the weight touches the bottom. The line is marked in *fathoms*. (1 fathom = 6 ft.)

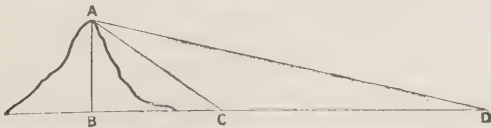
There are several methods of ascertaining heights, the method employed depending upon whether the height to be measured can or cannot be reached.

(1) **By the Thermometer.**—The temperature at which water boils depends upon the pressure of the air upon its surface, and as the pressure decreases as we ascend, the boiling point of water decreases also. At the level of the sea, water boils at a temperature of 212° F.; at the top of Mont Blanc (15,000 ft.), it boils at 185° . This is equivalent to a fall of 1° F. for every 550 ft. ascended.

(2) **By the Barometer.**

(3) **By Trigonometrical calculation.**—We saw above (Triangulation) that if a side and two angles of a triangle are known the remaining sides and angle can be calculated. Let us apply this method to find the height of an inaccessible mountain A (fig. 63).

FIG. 63.

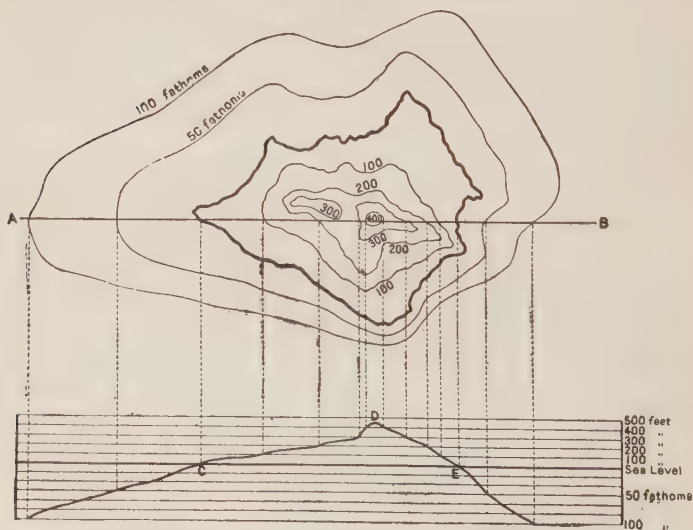


Measure a base-line CD , and observe the angles ADC and ACD by means of a theodolite. We can now calculate AC . With AC

known, the length of AB (the height of the mountain) can be easily found, for the angle ACB can be observed and the angle BAC is its complement.

Heights and depths being measured, it is necessary to devise a method of representing them on the map. In this book this is done by means of different colours. Look at the map of England on p. 124. The high and low portions of the country can be distinguished at a glance; land below 1,000 ft. in elevation is coloured green, and land above 1,000 ft. brown. When greater detail is required another method is resorted to, which can best be

FIG. 64.



explained by reference to an example. Fig. 64 represents an island, of which the height in various parts has been measured. All the points having an elevation of 100 ft. are joined by a line, and similarly all the points 200, 300, and 400 ft. in height. These lines are called **contours**, and it is by such lines that elevation is shown on maps in which great detail is required, such as those used by engineers in road and railway construction, and by soldiers in time of war. In the above map a section has been drawn along AB , and the heights projected on to a vertical scale below. The irregular line CDE shows the rise and fall of the road you would take in crossing the island in the direction shown by AB .

A second method of showing elevation is more usually employed in atlases, and consists in distinguishing heights by degrees of shading, as in fig. 65. Where the slope is gentle the shading is light; where it is steep the shading is heavy. The lines of shading are called **hachures**.

FIG. 65.



Scale.—It is obvious that a map must be drawn very many times smaller than the area to be represented, but the exact ratio between the two is determined by the size of the sheet on which the map is drawn and the extent of area to be included. If we draw the plan of a house, it would be possible to represent a foot of actual measurement by an inch on the plan, and the scale would then be 1 : 12, and would be represented by the fraction $\frac{1}{12}$. In the map of India on page 377, 500 miles are represented by 1 inch. The scale in this map is therefore 1 : 31,680,000. Before drawing a map, the area of the country to be represented and the size of the sheet on which it is to be drawn should be carefully calculated, and a suitable scale decided upon.

MAP READING

In making maps it has been found necessary to adopt certain conventions that shall be common to all maps to represent certain physical features. It has already been shown (p. 80) that **elevation** is represented by colour, contour lines and hachures. The **depth of the sea** is often shown by different shades of blue to represent different depths as measured in fathoms; thus a light blue near the coast enclosed by a blue line may represent a depth of 100 fathoms; a deeper shade and line 600 fathoms, and so on. **Rivers** are represented by wavy lines. **Lakes** are shown on coloured maps marked in blue like the sea and simply enclosed by a wavy line on black and white maps. These conventions apply to maps on a very small scale and are found in maps of countries or continents in the ordinary atlas. Maps have been produced, however, on a much larger scale, and the best known of these are the ordnance survey maps.

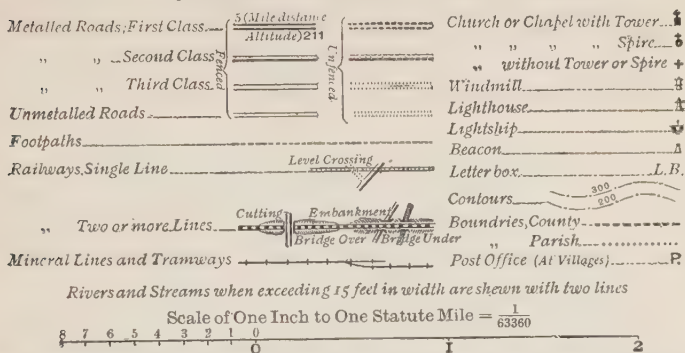
Ordnance Survey Maps.—The Ordnance Survey Office issues a series of maps on different scales, such as $\frac{1}{2}$ inch to a mile; 1 inch to a mile; 6 inches to a mile, and in these maps a large number of conventional signs are used. The following show the signs that are used upon a one-inch ordnance survey map.

FIG. 66.—PART OF A ONE-INCH CONTOURED MAP, SHOWING THE LAND AROUND LAKE THIRLMERE.



In studying the map on page 82 the steepness of the land rising from the south end of Lake Thirlmere to the top of Helvellyn should be noted as

FIG. 67.—Symbols used on one-inch Ordnance Survey Map.



well as the rapid descent from Lower Man to Keppelcove Tarn. It should be noted that the closer the contour lines are together the steeper is the ascent.

EXAMINATION PAPERS

- A. 1. What part of the world is most distorted in a map upon Mercator's projection?
2. Why cannot we use a scale of miles in measuring distance upon a map on Mercator's projection?
3. Which projection is most suitable for a country, and why?
4. What is meant by Conical projection?
- B. 1. In a map of the world on Conical projection the number of miles between parallels of latitude are always the same, but the distance between meridians of longitude varies from the Equator towards the North and South Poles. Explain this.
2. What is meant by Triangulation? How is the principle applied to measuring the heights of mountains?
3. Upon the Ordnance map on p. 82, show what variations there are in the elevation if a line is drawn from Dunmail Raise to Keppelcove Tarn.
4. Show what conventions are used on an Ordnance map to mark a first-class road, a footpath, a church with a tower, a county boundary, a contour, and a lighthouse.

EUROPE

POSITION AND SIZE.—Europe lies almost wholly in the North Temperate Zone. A small portion of the extreme north is within the Arctic Circle, but no part of Europe touches the Northern Tropic.

The most northerly point on the mainland is **Cape Nordkyn**, in lat. 71° N., and the most southerly point is **Cape Tarifa**, in Spain, lat. 36° N. From east to west Europe extends from 66° E. to **Cape Roca**, nearly $9^{\circ} 30'$ W. Including the British Isles, the most westerly point is **Dunmore Head**, $10^{\circ} 30'$ W., in Ireland.

The **Boundaries** of Europe on the north, south, and west are clear; but in the east it is not easy to decide the boundary between Europe and Asia. Strictly speaking, Europe is only a peninsula of Asia, but it has always been considered as a separate continent. The generally accepted boundaries in the east are the **Ural Mountains**, **Ural River**, **Caspian Sea**, and the valley in which flows the **Manich River**, a tributary of the Don.

By taking this last stream as a boundary line, the whole of the Caucasus region is included in Asia.

SIZE.—Length, from **Cape St. Vincent** to the mouth of the **Kara River**, 3,400 miles. Width, from **Cape Nordkyn** to **Cape Matapan**, 2,400 miles.

AREA.—About $3\frac{3}{4}$ million sq. miles.

GENERAL RELIEF.—The surface of Europe may be roughly considered as in three divisions.

1. The great bulk of the continent is formed by the **Great European Plain**, which includes all Russia and stretches westward through Germany to the North of France.

2. A series of highlands, from the Black Sea to the western coast of Spain, filling much of Central Europe, and extending southwards into the great peninsulas—viz. **Balkan, Italian, and Iberian**. This great succession of mountain ranges naturally forms the chief watershed of Europe.

3. A great elevated peninsula in the north—viz. **Scandinavia**—consisting of a high plateau with mountains running across the surface.

THE GREAT EUROPEAN PLAIN.—This plain is remarkably level, and the strata underlying it do not seem to have been affected by the forces which have acted upon the other parts of the surface of Europe and of Asia. In Russia the only elevation of any consequence is that of the **Valdai Hills**, which, though only about 1,200 ft. in height, form the chief watershed for Russian rivers.

OTHER PLAINS.—The **Plain of Hungary** is second in size, and consists of an extensive region encircled by a rim of mountains and drained by the Danube.

The **Plain of Lombardy**, in Northern Italy, is a fertile district, which has for a very long period been the home of a dense population.

France consists chiefly of a plain with a gradual slope from south-east to north-west.

In the **Italian and Iberian Peninsulas**, small plains lie near some of the coasts.

CENTRAL MOUNTAIN SYSTEM.—Commencing near the western shores of the Black Sea, the **Balkan Mountains** stretch across the Balkan Peninsula, giving off spurs and ranges which occupy almost the whole of Turkey, Greece, and the Danubian States. The **Carpathians** describe a curve of nearly 1,000 miles, enclosing the Hungarian Plain. They approach the river Danube at each end of the system, and are separated from the Balkans by the Danube. The **Eastern Alps** extend from the Balkans through the west of Austria, filling the district called the **Tyrol** and the east of Switzerland. The **Central Alps** occupy a large part of Switzerland, and bound Northern Italy. The **Western Alps** form the boundary between France and Italy, and describe a curve round the Gulf of Genoa, joining the **Apennines**, which form the backbone of Italy.

To the north of the Alps are numerous highlands forming the mountain system of **Germany**.

The **Pyrenees** are a very bold and striking mountain range



FIG. 68.

between France and Spain, and are continued under other names to the north-western corner of the Peninsula. **Spain and Portugal** consist almost entirely of a high plateau, crossed from east to west by several mountain ridges called **Sierras**.

MOUNTAINS AND HEIGHTS—**Mount Olympus**, 10,000 ft., in the south of Macedonia, is the highest peak in the Balkan Peninsula. The greatest height of the Balkan Range is 8,000 ft. In the Carpathians, the rugged group called the **Tatra** reaches the height of 8,700 ft. Of the **Alps**, **Mont Blanc**, 15,800 ft., **Monte Rosa**, 15,200 ft., and the **Matterhorn**, 15,000 ft., are in the **Pennine Alps**. In the **Bernese Alps** are **Finsteraar Horn** and **Jungfrau**, each 14,000 ft. **Mount St. Gothard**, 12,000 ft., is in the **Lepontine Alps**. **Gross Glockner**, 12,450 ft., in the **Noric Alps**, is the highest peak in Austria.

In the **Apennines**, **Monte Corno**, 10,000 ft., is the highest. **Mount Etna**, 11,000 ft., in **Sicily**, is the highest volcano in Europe.

The **Pyrenees** reach a height of over 11,000 ft. in the **Maladetta Group**. Of the **Sierras**, the highest is the **Sierra Nevada**, where **Mulahacen** is 11,500 ft.

SECONDARY RANGES.—In Germany are many ranges, of which the greatest elevation is about 6,000 ft. The chief ranges are the **Erzgebirge**, **Riesengebirge**, and **Harz Mountains**. In France, the **Jura**, **Anvergne**, and **Cevennes Mountains** have a greatest height of about 6,000 ft.

PLATEAUX.—1. **Scandinavian**.—The western portion of this great peninsula is occupied by a high plateau, having a remarkably steep descent into the Atlantic Ocean on the west, and gradually sloping towards the Baltic Sea on the east. The plateau is broadest and highest in the southern half, and gradually narrows with lessened elevation towards the north. Numerous mountain masses are scattered upon its surface,

known as the **Ynes Fjeld**, **Dovre Fjeld**, and **Kiolen Mountains**, in which the highest peak is over 8,000 ft.

Almost the whole of the plateau is remarkably bleak and barren, and is almost uninhabited.

The western edge is broken by innumerable fjords, and is lined by rocky islands, which form a second coast-line for long distances. In Sweden there is a considerable extent of level lowland, upon which a fairly numerous population dwell.

The habitable land in Norway is so small in extent that the voyages and incursions of the early Norsemen were caused largely by the need of finding new homes in other lands through overcrowding at home.

2. Iberian.—The greater part of Spain and Portugal is occupied by a plateau which has steep edges towards the sea on all sides, except at the mouths of the **Tagus**, **Guadiana**, and **Guadalquivir**, where the river valleys have considerable width. The plateau is separated from the **Pyrenees** system by the **Ebro Valley**. This plateau is dry, with great extremes of heat and cold, and is thinly peopled.

Balkan.—The western part of Turkey is an elevated table-land with many mountain masses, and it has a remarkably cold winter for its latitude.

Swiss.—The Swiss Plateau lies between the **Jura Mountains** and the **Alps**, and is the home of the bulk of the population of Switzerland.

German.—Southern Germany is occupied by a large plateau, in three divisions, of which **Bavaria** occupies the chief part.

Central Plateau of France.—This occupies an extensive area in Central and South-eastern France, and contains large tracts of bleak and barren country. Most of the rivers of France diverge from this region.

FIG. 69.



MOUNTAIN PASSES.—Numerous passes over the **Alps** have for many centuries been used to communicate with Italy from France, Switzerland, and Austria. The Alps have even been crossed by large armies under determined leaders, notably **Hannibal**, with elephants and cavalry, in ancient, and **Napoleon Buonaparte**, with artillery, in modern times. The commercial use of the passes has been much lessened by the construction of railway tunnels through **Monts Cenis** and **St. Gothard**. Some of the famous passes are the **St. Bernard**, **Simplon**, **Mont Cenis**, and **Brenner**.

The **Pyrenean** passes are very difficult; and, in fact, commerce is necessarily carried on round the eastern and western extremities, where the elevation is less.

The **Balkan** passes are high and difficult, and much encumbered by snow in the winter. The **Ural** passes are generally very easy. The **Carpathians** are no more difficult to cross than the Alps, but little commerce passes through them owing to the similarity of the productions of the countries on either side. Between Germany and Austria, the **Bohemian Forest** and the **Sudetes** form serious barriers to communication.

GLACIERS.—Two glacier regions exist in Europe:

(1) In the **Alps**, the chief are the **Mer de Glace**, upon **Mont Blanc**; the **Aletsch Glacier**, in the **Bernese Alps**; and that of **Mont St. Gothard**. These are all never-failing sources of the rivers which fertilise the soil and form waterways in Germany, Italy, France, and Switzerland.

(2) On the **Scandinavian Plateau** is the **Jostedalsbrae**, a very extensive glacier, 400 sq. miles in area.

RIVERS.—The European rivers may be classified according to their watersheds into—(1) **Russian rivers**; (2) **rivers of Central Europe**; (3) **Peninsular rivers**.

(1) **Russian Rivers.**—The chief watershed is that of the **Valdai Hills**, from which rivers flow to the **Baltic**, **Black**, and **Caspian Seas**. Stretching eastward from the **Valdai Hills** is a very low rising in the surface dividing the Arctic streams from those of the **Volga** system. The **Ural Mountains** form the watershed between the rivers of **European** and **Asiatic Russia**. The **Volga**, 2,200 miles long, is the largest river in Europe, and drains a basin over 500,000 sq. miles, or more than four times the area of the **British Isles**. Like all the **Russian rivers**, the **Volga** is very slow, and is obstructed by ice in the winter. When free from ice, the **Russian rivers** afford easy means of communication for many thousands of miles. The **Black Sea rivers**, **Don**, **Dnieper**, and **Dniester**, are obstructed by shallows in their lower courses. The **Arctic rivers**, **Petchora** and **Dwina**, are large streams, but are frozen for long periods yearly, and flow through desolate country. The **Baltic rivers**, **Neva**, **Dwina**, **Niemen**, and **Vistula**, are all of great commercial importance.

(2) **Rivers of Central Europe.**—The general slope on the northern side is towards the north-west, and hence many important rivers flow from the great mountain system into the **Baltic** and **North Seas**, **English Channel**, and the **Bay of Biscay**. The chief are the **Oder**, **Elbe**, **Weser**, **Ems**, **Rhine**,

FIG. 70.—EUROPE : RELIEF.



Scheldt, Seine, Loire, Garonne, and Dordogne, all having important seaports at their mouths, and being connected to a large extent by canals. On the southern side of the mountain system, the **Danube** drains the space between the German mountains and the Carpathians on the north and the Balkan and Alpine systems on the south. The **Po** drains the southern slopes of the Alps, and fertilises the rich alluvial plain of Lombardy. This river is in places higher than the surrounding country, and is restrained by high banks. The silt brought down by the Po is causing the land to gain upon the Adriatic Sea, and is also reducing the depth of the northern portion of that sea. The **Rhone** rises in the heart of the Alps, and drains the hollow between the western Alpine slopes and the east side of the French highland region. The **Danube**, 1,700 miles in length, is the second river in Europe, and is of vast importance politically, as forming an effective boundary between nations, and commercially as an excellent waterway for long distances. The navigation of the lower course is free to ships of all nations, and its affairs are controlled by an International Commission. Continuous navigation of the Danube is hindered by the Iron Gate, where the river leaves Austria.¹ The **Rhine**, 760 miles long, is second to no river of Europe in interest, historical, poetical, commercial, and political. Drawing its waters from glacial sources, the stream is always navigable, and is the main artery in a large and densely peopled portion of Europe.

(3) **Peninsular Rivers**.—The rivers of the four great peninsulas, Scandinavian, Balkan, Italian, and Iberian, have a general resemblance in the rapidity and varying depth of their courses, and are not of much service in commerce. In **Scandinavia**, the rivers of Norway, with one exception, are mere torrents tumbling precipitously into the sea. The **Glommen**, 400 miles long, is the only large river, and its valley has been made the track of a railway from **Christiania** to **Trondhjem**. In Sweden are numerous rivers of fair length, forming lakes in their upper valleys, and flowing into the Baltic Sea. The Scandinavian rivers are of great use in floating timber from the pine and fir forests to the sea, and in working numerous saw and other mills.

In the **Balkan Peninsula** the valleys of the **Maritza** and **Vardar** are occupied by railways connected with the Central European systems. The rivers of **Greece**, like those of **Italy**, are short and rapid, and are often dried up in summer.

In the **Iberian Peninsula** are many long rivers, notably the **Douro**, **Tagus**, **Guadiana**, **Guadalquivir**, and **Ebro**, of which all except the **Ebro** flow to the west. These rivers are mostly navigable only for a short distance from their mouths, and, as they lie in deep channels, cannot easily be connected by canals. The **Guadalquivir**, being fed by the snow-clad **Sierra Nevada**, has the most constant volume in summer.

Of the **British Rivers**, the chief are the **Shannon** in Ireland, **Severn** and **Thames** in England and Wales, **Clyde** in Scotland.

LAKES.—The European lakes are almost entirely in three districts—(1) the plateau of Finland; (2) the eastern portion of Scandinavia; (3) amongst the mountains of Central Europe, chiefly the Alps.

The lakes in (1) and (2) really form only one system.

Scattered lakes of moderate dimensions lie (a) on the Balkan plateau; (b) amongst the Apennines; (c) in the northern provinces of Prussia; (d) numerous small salt lakes in the south-east of Russia; (e) amongst the mountains of the British Isles.

¹ A navigable canal has been constructed in the Iron Gate, and opened for traffic in 1896.



1. The **Great Lakes, Ladoga** (6,800 sq. miles), **Onega** (3,300 sq. miles), **Saima**, **Ilmen**, and **Peipus**, occupy a large portion of the plateau of Finland and the adjacent country.

2. In **Sweden**, Lakes **Wener** and **Wetter** are much larger than any lakes of Southern or Central Europe.

3. The chief **Alpine** lakes are **Geneva**, **Lucerne**, **Zurich**, **Constance**, and **Maggiore**, all remarkable for their beauty.

In Austria are **Balaton** and **Neusiedler**.

COASTS.—The coast-line of Europe is exceedingly indented, much more so than that of any other continent. Great arms of the ocean run far into the land, and bring all parts of the continent within moderate reach of the sea, from which no place, even in Russia, is 1,000 miles distant. The western coasts generally are high and rocky, and are broken into very numerous openings with bold rocky headlands. This is notably the case in Norway, the western shores of the British Isles, Western France, and North-west Spain. On the other hand, the North Sea coast of Denmark, Germany, Holland, and Belgium is low, in Holland being lower than the sea-level; and, consequently, the sea has to be kept back by embankments called dykes.

The neighbourhood of the ocean in all Central and Western Europe has had the effect of (a) causing the climate to come under the moderating influence of the sea, being subject to less extremes of temperature than other parts of the Northern Hemisphere in corresponding latitudes; (b) making the inhabitants take the foremost place in navigation, exploration of distant lands, and in commerce.

SEAS AND OPENINGS.—The chief inland seas are the **Mediterranean**, **Black**, and **Baltic** Seas. The **Mediterranean Sea** is 2,400 miles in length, and is nearly 1,000,000 sq. miles in area. It is connected with the ocean by the Strait of Gibraltar, which is so narrow that the sea is almost a lake. The Mediterranean peninsulas, Italy and Greece, were the homes of the first civilised people of Europe; and from these civilisation spread to the west.

The chief characteristics of the Mediterranean are—(a) its saltness, being saltier than the ocean, owing to the great evaporation; (b) its great depth, being over 12,000 ft.; (c) its almost tideless character, the width from south to north not being sufficient for important tides to be created, and being beyond the reach of the ocean tides.

The **Black Sea** (180,000 sq. miles) is half as large again as the British Isles. It has a depth of 1,000 fathoms, and is saltier than the Baltic, but less so than the Mediterranean or the ocean waters. Connected by narrow straits with the Black Sea are the Sea of **Azof**, which is very shallow, and the Sea of **Marmora**.

The **Baltic Sea**, 135,000 sq. miles in area, is very shallow,

and its waters much less salt than the Black or Mediterranean Seas. This is caused by the large quantity of fresh water from the rivers and the slight evaporation.

The Baltic is frozen every winter, as is the Black Sea on its northern shores. There is a current flowing outwards to the Atlantic from the Baltic, but the current through the Strait of Gibraltar is always inwards.

The **North Sea**, **Irish Sea**, **English Channel**, and **Bay of Biscay** are the chief parts of the Atlantic Ocean touching Western Europe.

These seas are not frozen in winter, nor is the coast of Norway northwards to North Cape. If the bed of these seas were raised 100 fathoms, nearly all the North Sea, the whole of the Irish Sea and English Channel, and part of the Bay of Biscay would become dry land, and would thus show the British Isles to be the highest portion of a great tract continuous with the Great Plain of Europe.

The **White Sea** is a great arm of the Arctic Ocean, and is frozen for many months annually.

The **Caspian Sea** is the largest lake in the world, and is salt. Its area is about 170,000 sq. miles, and its greatest depth nearly 3,000 ft. The surface of this inland sea is 84 ft. lower than that of the ocean.

CAPES.—Some of the most prominent capes are : **Nordkyn** and **North Cape**, in the north of Norway—the latter being upon an island ; the **Naze**, in south-west Norway ; the **Skaw**, in Denmark ; **Cape Wrath** and **Land's End**, in Great Britain ; **Cape Clear**, in Ireland ; **Gris Nez**, **La Hague**, and **Ushant**, in France ; **Finisterre**, **Ortegal**, **Roca**, **St. Vincent**, **Trafalgar**, **Tarifa**, and **Europa**, in the Iberian Peninsula ; **Corso**, in Corsica ; **Spartivento**, in Sardinia ; **Di Leuca**, in Italy ; **Passaro**, in Sicily ; **Matapan**, in Greece.

ISLANDS.—Two groups of large islands lie near the coast of Europe, viz. **British Isles** and **Corsica and Sardinia**. **Sicily** is a large island very close to and forming part of Italy. **Iceland** is also considered to be European, though nearer Greenland, having from ancient times had close relations with European countries and its people being Teutonic.

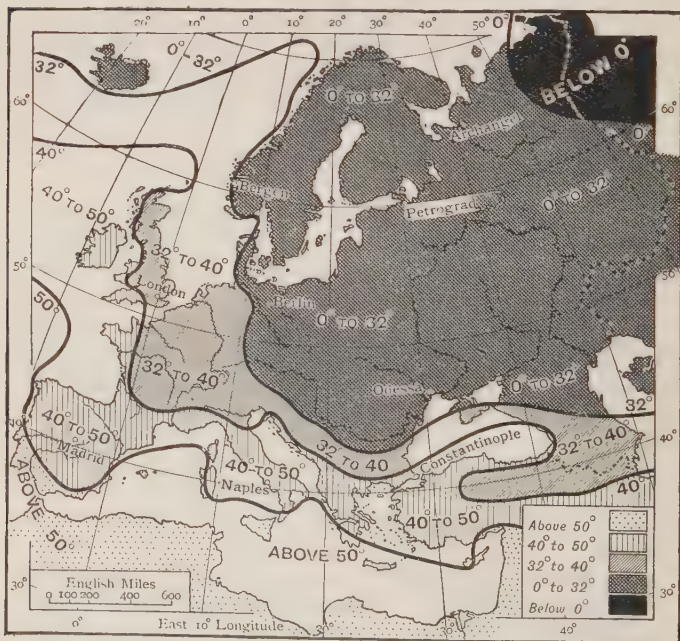
Groups of lesser size are the **Lofoten Islands**, a very mountainous group off Norway ; the low **Dutch Islands**, forming part of Holland ; **Balearic Islands**, in the Mediterranean Sea, belonging to Spain ; and the **Greek Archipelago**, consisting of a large number of islands between Greece and Turkey in the Egean Sea. **Candia** (or Crete) lies outside the limits of the Archipelago, and is of considerable size. The **Ionian Islands** are a numerous group lying on the west coast of Greece. The **Danish Islands** form an important portion of Denmark, and lie between the mainland of Jutland and Sweden. The **Baltic Islands** consist of several groups—the **Aland Islands**,

Oesel, Dago, and others—off the Gulf of Riga; **Rügen**, and some small islands on the coast of Germany. The **Channel Islands** lie near the north of France, but belong to England.

Numerous small islands lie near the coast of Norway; on the coast of Germany, between the mouth of the Elbe and Holland; on the west coast of France; off the north-west of Spain; and on the Austrian coast in the Adriatic Sea. The Maltese Islands are between Sicily and Africa.

CLIMATE AND RAINFALL.—Generally speaking, the climate of Europe may be described as **Temperate**, and as having

FIG. 72.—EUROPE: JANUARY ISOTHERMS.



Emery Walker sc.

less extremes of heat and cold than other parts of the Northern Hemisphere in the same latitude.

Several important peculiarities and modifications have to be considered in arriving at a correct estimate of the European climate.

(a) The variation of temperature is greater from west to east than from north to south: *e.g.* the shores of the British Isles and of Norway are not ice-bound in winter, while those of the Black Sea, from 20° to 40° further south, are regularly bordered with ice in winter.

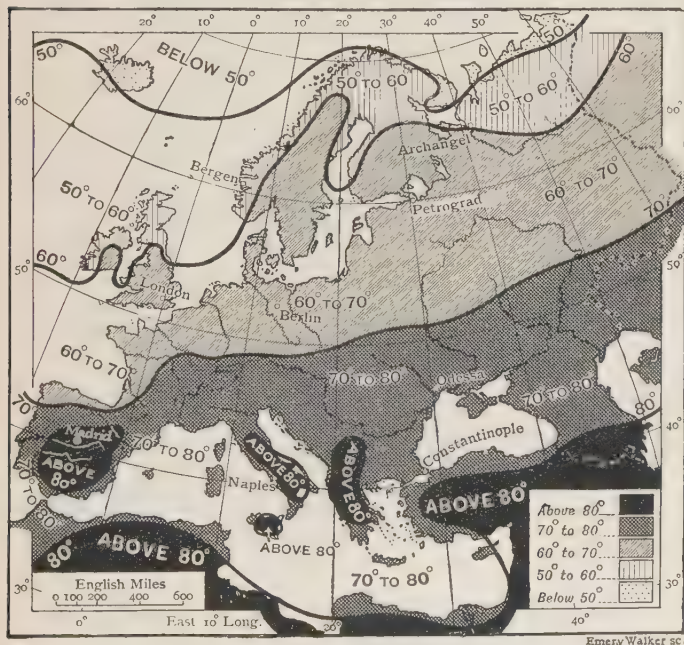
(b) The difference in temperature in the countries lying between the Baltic Sea on the north and the Alps and Balkans in the south is slight.

This is caused by the great elevation of the southern half of this region.

NOTE.—In studying isotherm maps it must be noted that the temperature of any place approximates to that of the isotherm to which it is nearest. This is due to (1) the great moderating influence of the warm ocean winds and currents upon all Western Europe ; (2) the absence of any range of mountains upon the great plain which embraces the bulk of the surface, and hence the northern cold winds, as well as the hot south winds, have free play.

The map of winter isotherms shows that the isotherm of 40° cuts the parallel of 60° N. Lat., makes a big bend to the south along the western side of Great Britain, and reaches 42° N. Lat. in the southern part of Turkey. A study of the winter isotherms shows clearly the moderating influence of the ocean

FIG. 73.—EUROPE: JULY ISOTHERMS.



along western Europe ; also, that the small elevation of the land in northern and eastern Russia brings the temperature of places in southern Russia to nearly the low level of places near the Arctic Circle.

The **Rainfall** throughout the great bulk of the surface is sufficient for agriculture, but certain districts suffer from a scanty downfall. For example, the **Plateau** in the south-east of Spain suffers from drought in summer, because the high mountains on its borders condense the rain clouds. The south of **Italy** and all **Greece** are very dry, being out of the direction of the Atlantic

prevailing winds, and coming more under the influence of hot, dry winds from Africa. The **Hungarian Plain** suffers from drought because of its great size and the condensation of the rain-clouds upon the encircling mountains. The greater part of northern and eastern Russia is dry because the rain-bearing clouds from the Atlantic discharge their rain upon the mountains of Norway and Sweden, or in crossing Central Europe.

FIG. 74.—EUROPE: ANNUAL RAINFALL.



PRACTICAL EXERCISES ON CLIMATE.

1. Draw a line from London to the Nile Delta. What countries or seas will it pass through, and what is the January temperature of each?
2. Explain why the winter temperature of Berlin is so much lower than that of Dublin.
3. Draw a line from Archangel to the Strait of Gibraltar, and give reasons for the variations of winter climate in the countries through which it passes.
4. What is roughly the difference in latitude between Ireland and Greece, and explain the physical conditions that cause the winter temperature to be so similar in these two countries.
5. What is the chief cause of the similarity between summer heat at Archangel and London, though the latter is so much farther south?

6. What are the causes of the great summer heat in Central Italy and the plateau in the south-east of Spain ?

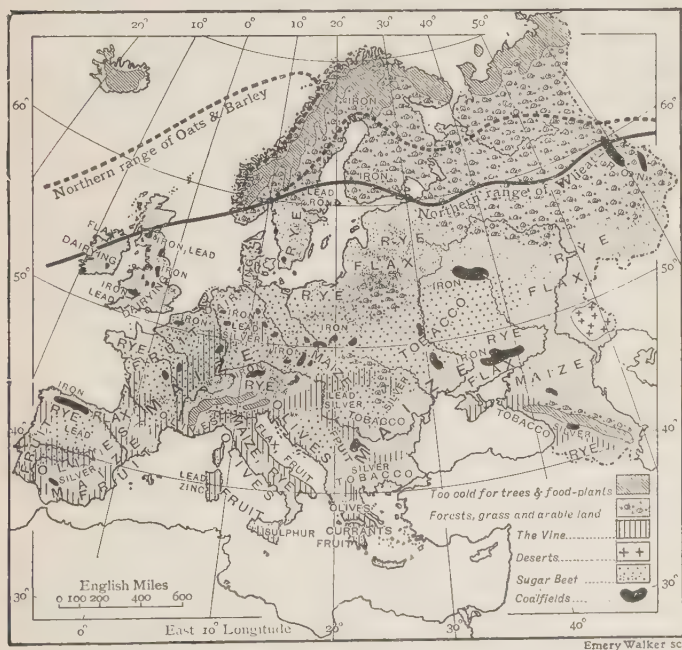
7. What is the cause of the small rainfall over eastern Russia ?

8. Explain the heavy rainfall of N.-W. Spain, the western side of the British Islands, and the south of Norway.

CLIMATIC REGIONS.—Europe can be divided into three climatic regions :

1. Western Europe, with a **temperate** climate and sufficient rainfall.

FIG. 75.—EUROPE: VEGETATION.



2. Eastern Europe, with a **more extreme** climate and smaller rainfall.

3. The Mediterranean region, with a **mild** climate and good rainfall.

PRODUCTS.—1. **Vegetable.**—Although in Europe civilisation and scientific methods have brought agriculture to a high degree of perfection, and have rendered the distribution of

cultivated plants more general than in other continents, distinct belts of vegetation may nevertheless be traced.

(a) The **tundras** of Northern Russia are a continuation of those of Siberia.

(b) The **forest belt** of the north temperate region which stretches from Scandinavia across Russia. The trees consist mainly of **pin**es and **firs**, and they give rise to important industries, such as felling and lumbering; the preparation of wood products, *e.g.* resin, pitch, turpentine, &c.; the manufacture of wooden articles, doors, &c., and matches; the reduction of timber unfit for other purposes to pulp for making paper. The most important grain crops of this belt are **barley**, **oats**, and **rye**.

(c) The **belt of arable and pasture land** extending from France, through Belgium, Holland, Germany, and Russia, to the Urals. The chief crops are **wheat**, **beet**, and the **vine** in the west, and **rye**, **oats**, **flax**, and **hemp** further east. France is the largest wheat-growing country of Europe. Forests of deciduous trees, such as **oak**, **beech**, **elm**, and **ash**, occur in various parts, especially on the higher lands.

(d) The **steppe lands** of south-eastern Russia have a short hot summer and a severe winter, and get very little rain. They are a continuation of the steppes of south-west Asia. Trees cannot grow, but good **pasture** springs up in the summer and supports large numbers of domestic animals, the chief wealth of the people.

(e) The **Mediterranean Region** is the land of fruits. **Olives**, **oranges**, **grapes**, **figs**, and other fruits grow in abundance, and in the south of the peninsulas semi-tropical plants, such as **maize**, **cotton**, **rice**, and **tobacco** flourish. The characteristic trees of this region are evergreen. An important tree product is **cork**, obtained from the bark of an evergreen oak.

2. **Animal**.—Large wild animals, such as the bear, wolf, and boar, are chiefly confined to the forests of Russia, Scandinavia, Germany, and Austria-Hungary, and to some extent in the Balkan and Spanish Peninsulas. The chamois is becoming extinct, though still found on the high Alps. Hares, rabbits, foxes, badgers, otters, and numerous birds are still very widespread.

The chief **domestic** animals are cattle, horses, sheep, pigs, and goats. The horse is the chief beast of burden in Northern, and the mule or ass in Southern Europe.

The camel is used in the south of Spain.

The dog is also kept in all parts of Europe, either as a pet, or for use in the chase, or even as a draught animal.

3. Fisheries.—The food-fishes of European seas, lakes, and rivers are very varied in species and exceedingly abundant. Employment is given to great numbers of persons in the catching and preparation of fish in all the maritime countries.

In the northern seas are the **cod**, **herring**, **mackerel**, **pilchard**, and very many others. In some of the rivers and lakes **salmon** and **trout** are abundant. In the **Mediterranean Sea** the **tunny**, **anchovy**, and **sardine** are caught in great quantities.

In the **Russian** rivers and seas the **sturgeon** is abundant, and of great value.

Of predatory fishes, the **dog-fish** and **porpoise** are very common. Certain varieties of **seal** live on the shores of Europe, but not in great numbers.

Sponge and **coral** fisheries employ many men in the **Mediterranean Sea**. **Oysters**, **lobsters**, and **crabs** are widespread.

4. Mineral.—Europe is remarkably rich in all forms of mineral wealth, except the precious metals, gold and silver, and precious stones. The minerals are chiefly found in the mountainous or hilly regions, particularly in the **British Isles**, **Germany**, **Austria**, **Sweden**, and **Spain**. The districts deficient in mineral wealth are the lowlands of France, Holland, Denmark, Northern Germany, the Hungarian Plain, and the plain of Russia. The most valuable minerals worked are **coal**, **iron**, **lead**, **copper**, **tin**, **salt**, **mercury**, **slate**, **marble**, **building-stone**, and **zinc**.

The Swiss Alps are remarkably deficient in metal ores and in coal.

PEOPLE.—The population of Europe is more evenly distributed than in any other continent. It has no great deserts, such as the Sahara in Africa or the Desert of Gobi in Asia. Nearly the whole of the Continent lies within the North Temperate Zone ; a large area is either plain or rolling uplands, its nearness to the Atlantic ensures a good rainfall, the soil is generally fertile, and further there is an abundance of minerals. The population is densest in Belgium, England, the manufacturing districts of Germany, and Northern Italy. The most thinly inhabited parts of the Continent are the extreme north, where the climate is too severe for the growth of food plants, and the sterile regions of south-eastern Russia.

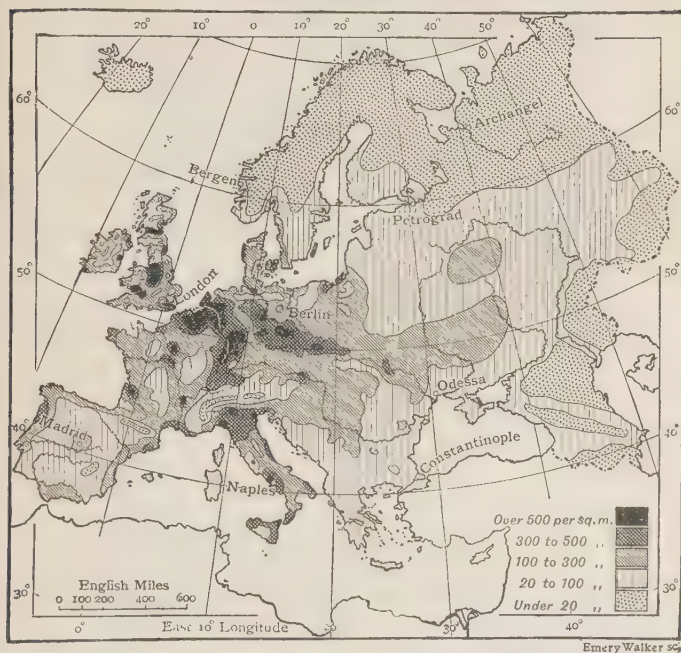
The great bulk of the people of Europe are either of pure **Aryan** or a mixture of **Aryan** with **pre-Aryan** races. The chief branches of the Aryans are the **Teutons**, who form the majority of the inhabitants of Germany, Scandinavia, British Isles, Holland, and part of Austria ; the **Celts** in France, the western parts of the British Isles, and parts of Spain ; the **Slavs** in Russia and many of the States of Austria and the Danubian States ; the

FIG. 76.—EUROPE: POLITICAL.



Latins and Hellenes in Italy and Greece. The pre-Aryan race is chiefly represented by the **Basques** in the Pyrenees. Other **non-Aryan** races are the **Turks** and **Magyars** in Turkey and Hungary,

FIG. 77.—EUROPE: DENSITY OF POPULATION.



and the **Finns** and **Lapps** in Northern Europe, branches of the **Turanian** stock. About 400,000,000.

THE COUNTRIES OF EUROPE, WITH THEIR CAPITALS

England . . .	London	Russia . . .	Petrograd
Scotland . . .	Edinburgh	Rumania . . .	Bucharest
Ireland . . .	Dublin	Sweden . . .	Stockholm
France . . .	Paris	Norway . . .	Christiania
Holland . . .	The Hague	Denmark . . .	Copenhagen
Belgium . . .	Brussels	Spain . . .	Madrid
Germany . . .	Berlin	Portugal . . .	Lisbon
Switzerland . . .	Bern	Italy . . .	Rome
Austria . . .	Vienna	European Turkey	Constantinople
Hungary . . .	Buda-Pesth	Greece . . .	Athens
Czecho-Slovakia	Prague	Serbia . . .	Belgrade
Jugo-Slavia . . .	Zagreb (Agram)	Bulgaria . . .	Sofia
Poland . . .	Warsaw	Montenegro . . .	Cetinje
Finland . . .	Helsingfors		

EXAMINATION PAPERS

- A. 1. Describe the surface of that part of Europe which lies between the Skaw and Cape Passaro, in Sicily.
 2. State the position of the following :—The Tatra, Matterhorn, Gross Glockner, Mulahacen, and Olympus.
 3. Describe the chief lake systems of Europe, showing their position, points of difference, and naming the chief lakes.
 4. Name the chief minerals of Europe, and the countries where they are most abundant.
- B. 1. Compare the Scandinavian and Iberian Peninsulas.
 2. Name the chief Alpine passes, and compare them with the passes of the Pyrenees and Balkans.
 3. Where are Cape Ushant, Cape Tarifa, Cape Corso, Candia Island, Dago, river Neva, the Sudetes, the Aletsch Glacier, Lake Balaton, and Rugen Island?
 4. Compare the climate of the British Isles with that of Southern Russia, and account for any peculiarities.
- C. 1. What are the physical conditions that make a dense population possible in a country?
 2. The leading manufacturing countries of Europe are Great Britain, Germany, France, and Belgium: explain the physical conditions that have led to this.
 3. Which are the most thinly peopled countries of Europe, and how do you account for the small population in each?
 4. Where are the chief coalfields of Europe? What are the conditions that favour growth of manufactures?

THE BRITISH ISLES

GENERAL DESCRIPTION.—The British Isles form an extensive group situated to the west of the continent of Europe, from which they are separated by the North Sea, the Strait of Dover, and the English Channel. There are in all about 5,000 islands, large and small, only two of which are of considerable extent—Great Britain and Ireland. The islands of the group may be regarded as the higher portions of what was once a great westerly extension of the continent, which was sunk until the islands are the only portions remaining above water. That the group was once connected with the mainland is inferred from the fact that the plants and animals of both are of similar species, and that the geological formation of the eastern coast of Great Britain is in many respects similar to that of the opposite mainland; the chalk cliffs of Kent reappear on the shores of France, the lowlands of the Fen district correspond to the lowlands of Holland, while the bolder and more rocky shores of Northern Scotland and the Shetlands resemble the opposite shores of Norway.

The seas separating the islands from each other and the mainland are shallow. If the sea-bed were raised 600 ft., the sea all round the islands would be dry land, and the group would again form part of the continent, as shown in fig. 78.

If the bed were elevated 120 feet, Great Britain would form a peninsula, and the Dogger Bank would form a large island in the North Sea (see fig. 79).

FIG. 78.—EFFECT OF SEA-BED BEING RAISED 600 FEET.



The Irish Sea is also very shallow, the greater portion being less than 300 ft. in depth, while the English Channel, though deeper than the North Sea, does not exceed 180 ft. at the Strait of Dover.

The distance between the group and the mainland varies considerably. At the Strait of Dover, Great Britain approaches to within a distance of 21 miles; towards the north the coasts recede on each side, and the North Sea widens out to a distance of over 400 miles; still further north the coasts again approach, the Shetlands being about 200 miles from Norway.

Ireland is only 13 miles from Great Britain at the North Channel; further south the Irish Sea widens to 140 miles, narrowing again between Holyhead and Dublin to 60 miles.

SIZE.—The whole group forms an irregular triangle, having its base in the south and its apex in the Shetland Isles. The total area of the group is about 121,000 sq. miles. From the Scilly Isles in the south to the Shetlands in the north is

upwards of 700 miles, while from the coast of Suffolk to the west of Ireland is about 500 miles.

Of the two chief islands, **Great Britain**, the larger, has an area of 88,000 sq. miles (England and Wales 58,000, Scotland 30,000), an extreme **length** of 587 miles, and a **breadth** varying from 25 miles between the Firths of Forth and Clyde to 250 miles between the Suffolk coast and Cardigan Bay. **Ireland**, the smaller island, has an area of 32,583 sq. miles, with a **length** of about 300 miles and an **average width** of about 150 miles.

NATURAL ADVANTAGES.—The British Isles are the home of one of the most powerful nations the world has ever seen.

FIG. 79.—EFFECT OF SEA-BED BEING RAISED 120 FEET



Their people have spread all over the globe, the total area of the empire now exceeding 11,000,000 sq. miles (an extent of surface equal to that of the whole continent of Africa, and more than one-fifth of the land surface of the globe), and containing a population of about 400,000,000, that is, more than the population of all the countries of Europe, and exceeding one-fourth of the whole human race. They are the greatest commercial and manufacturing nation in the world, their shipping exceeding the combined shipping of all the other great maritime countries of the globe. This remarkable development is largely due to the following **natural advantages**: their **mild and equable**

FIG. 80.—BRITISH ISLES: RELIEF.



climate, the relief of the land, the fertility of the soil, the geological formation (giving access to the mineral wealth and thus promoting manufactures), the configuration of the coast line, their situation with regard to other countries, and their insular position.

1. **CLIMATE.**—(a) **Temperature.**—The group lies entirely within the North Temperate Zone, and this situation, combined with the insular position, prevents great extremes of heat and cold. The climate is warm enough for abundance of fruits to grow, corn ripening in England even at an altitude of 1,000 ft., but it is not cold enough to prevent outdoor work being carried on throughout the year, nor to stop trade by freezing the harbours. Compared with some countries in the same latitude, the British Isles possess a much warmer climate. To the west, Labrador, which is about the same distance north of the Equator, presents a striking contrast in this respect; there the **average yearly temperature** ranges from 20° to 30° only, while in the British Isles it varies from 46° in the north to 52° in the south. To the east the difference is equally marked, Kamchatka having a mean annual temperature of only 30° , although in about the same latitude. The south-west of Ireland has a winter temperature of 45° , resembling that of Central Italy, which lies 10° farther south. In Scotland the difference between the summer and winter temperature is about 20° , while at the same latitude in Eastern Russia the difference is 60° , the rivers are frozen, and outdoor work is suspended for several months.

Again, the western coasts of the British Isles are more under the influence of the warm winds from the Atlantic, and consequently have a milder climate in winter than the eastern coasts; while, on the other hand, the summers are hotter in the south-east than in any other part of the group.

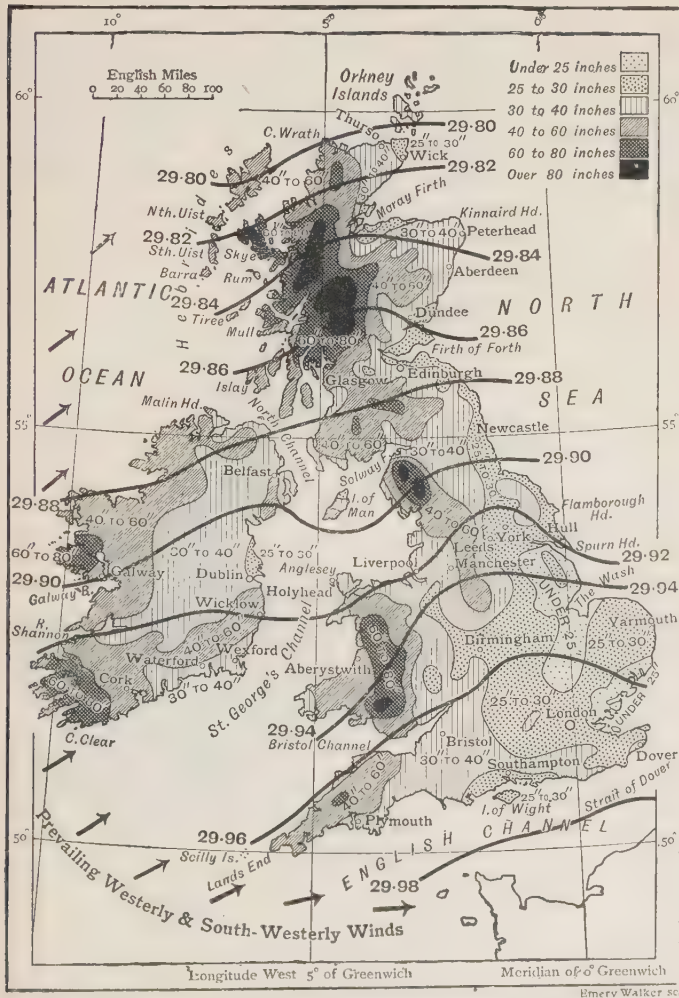
Such a climate as that of the British Isles is said to be **insular**—that is, one in which the annual range of temperature is small, for the winds from the sea lessen the cold of winter and moderate the heat of summer.

The striking difference in the range of temperature between places which have an insular climate like London and Edinburgh when compared with other places in about the same latitude but which do not experience the modifying influence of the sea, and which possess what is termed a 'continental climate,' is seen from the following figures:—

	Jan. temp.	July temp.	Difference between summer and winter.
{ London (lat. $51^{\circ} 30'$) . . .	36	63	27
{ Irkutsk (lat. 52°) . . .	3	65	62
{ Edinburgh (lat. $55^{\circ} 57'$) . . .	38	57	19
{ Moscow (lat. $55^{\circ} 45'$) . . .	12	67	55

(b) **Rainfall.**—The mildness and equability of the climate are largely due to the prevalence of south-westerly winds from the

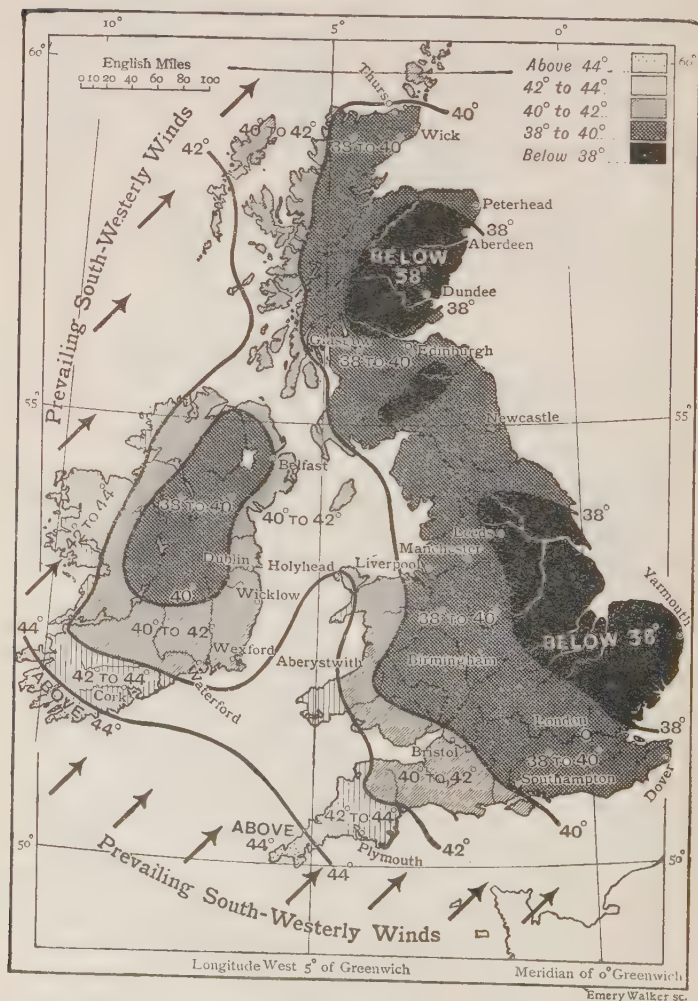
FIG. 81. BRITISH ISLANDS : ANNUAL RAINFALL AND ISOBARS.



ocean, which, blowing over the waters of the Gulf Stream, are warm and laden with moisture ; hence the rainfall of the British

Isles is greater than that of the countries on the mainland. Edinburgh, on the drier side of Great Britain, has a rainfall

FIG. 82.—BRITISH ISLANDS: JANUARY ISOTHERMS.



of 30 inches, while Moscow, in Russia, has only 12 inches. These south-west winds strike the western shores first, hence the rainfall

is greater in the west than in the east; considerable tracts in South-Western Ireland and Western Scotland, with smaller ones

FIG. 83.—BRITISH ISLANDS; JULY ISOTHERMS.



in the West of England and Wales, having an annual rainfall exceeding 50 inches. Although these winds strike Ireland first,

the mountains of that island are not sufficiently elevated to prevent the winds carrying much of their moisture to Great Britain, and where the mountains are high, as in the Cumbrian Group and the western part of the Grampians, the rainfall in places is as much as from 70 to 80 inches. In isolated spots in the western mountains of Scotland it exceeds 120 inches, while at Seathwaite in Cumberland it exceeds 150 inches.

The eastern side of Great Britain is much drier, the annual rainfall being from 25 to 30 inches. This comparative dryness favours the growth of grain crops, while the heavier rainfall of the western side of the group is more favourable to the growth of pasture.

PRACTICAL EXERCISES.

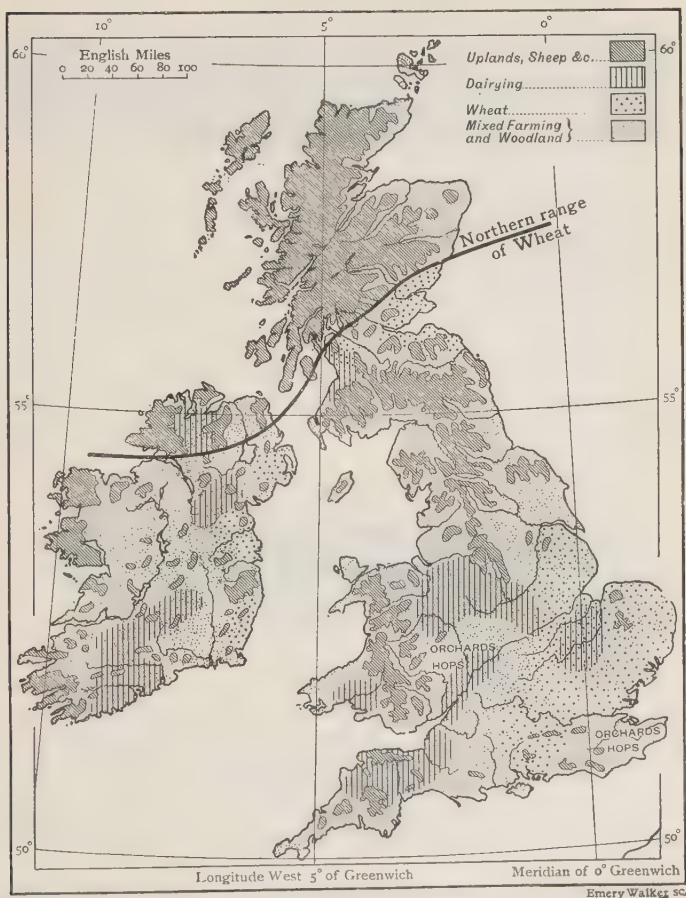
1. What parts of the British Isles have the heaviest rainfall?
2. What are the causes of the heavy rainfall upon the mountains of Cumberland?
3. Why is Cork so much warmer in winter than Yarmouth?
4. In summer the heat of the midland counties of England is greater than that of south-west Ireland in the same latitude. Explain why.
5. What is the cause of the great bend towards the north of the July isotherm of 58° through the middle of Scotland?
6. The January isotherm of 42° ranges from about 50° N. lat. to nearly 60° N. lat. What is the cause of this great range?
7. What is the driest part of the British Islands? What are the causes of the small rainfall on this part?
8. London lies between the isobars of 29.98 and 29.96. Wick lies between those of 29.82 and 29.80. What differences in weather might be expected throughout the year?

2. RELIEF OF THE LAND.—There are no high ranges of mountains in the British Isles, and the elevation on the whole is towards the west. From the Peak in Derbyshire highlands extend northwards to Cape Wrath, only broken by three depressions, the first being between the Tyne and the Solway, the second between the Forth and Clyde, and the third between Moray Firth and Loch Linnhe. In **England** the hills are in the west, and the land slopes gradually towards the east, hence the rivers are slow and navigable, and the eastern, central, and southern parts consist mostly of low and fertile land. By far the greater portion of the surface is under 500 ft. in elevation. In **Scotland**, on the contrary, the greater part of the surface is above 500 feet in elevation, the country is mostly covered with high hills and plateaux, the only lowland districts are near the coast, and the rivers are, on the whole, rapid, shallow, and useless for navigation. In **Ireland** the country consists of an extensive plain in the centre, bordered by broken ranges of hills. This central plain is so little elevated that were the country lowered 200 feet Galway Bay and Dublin

Bay would be united by sea. Like England, most of the surface is below 500 feet, and the rivers are slow and navigable, with good harbours at their estuaries.

3. FERTILITY OF THE SOIL.—The rainfall and rivers have, in the course of ages, covered the lowland districts of Great

FIG. 84.—BRITISH ISLANDS : VEGETABLE PRODUCTS.



Britain and Ireland with a good depth of fertile soil suitable for cultivation ; while the hills are not entirely unproductive, affording in many cases pasturage suitable for sheep. Of the three

countries, **England** has by far the largest proportion of productive land, more than three-fourths being cultivated ; if we deduct the area occupied by woods, towns, railways, &c., the amount of unproductive land is comparatively small (less than one-fifth). In **Scotland** less than one-fourth is cultivated ; in **Ireland** nearly three-fourths is available for cultivation.

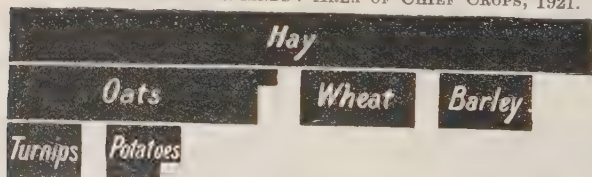
FIG. 85.—BRITISH ISLES : DISTRIBUTION OF SURFACE.



In the whole group about 62 per cent. is productive land. This proportion, although larger than in many, is less than in some other European countries. France and Belgium have about 84 per cent. of productive land (cultivated, pasture, and wood), while Germany returns 94 per cent. as productive.

The land, however, in Great Britain is in a higher state of cultivation than in any other country. This is due to improved systems of agriculture and the use of artificial manures ; the yield of wheat in bushels per acre in England is 29, Holland and Belgium 25, France and Germany 18, and in the United States 12.

FIG. 86.—BRITISH ISLANDS : AREA OF CHIEF CROPS, 1921.



A comparison of the map showing vegetable products with the rainfall map and the map of July isotherms will bring out clearly the reason why wheat ripens best in the eastern counties, and why the western side of England is largely devoted to dairying. It will also explain why so small a part of Ireland produces wheat.

The principal corn and heavy green crops in order of acreage are :—(1) In Great Britain—Oats, barley, turnips, wheat, potatoes, beans, and peas.

(2) In Ireland—Oats, potatoes, turnips, barley, and wheat.

In round numbers the British Isles has about 25,000,000 acres of grass land, against 20,000,000 acres in other crops (1921).

The numbers of live stock in Great Britain in 1922 were as follows :—

	GREAT BRITAIN	IRELAND
Horses	1,308,000	443,000
Cattle	6,869,000	5,156,000
Sheep	20,122,000	3,566,000
Pigs	2,450,000	1,160,000

4. GEOLOGICAL FORMATION.—The earth's crust is composed of layers of different kinds of rocks, of which, as a rule, the hardest lie deepest. These different rocks contain different minerals. In the British Isles nearly all kinds of rocks crop up at the surface, the strata being tilted up ; hence Great Britain is particularly rich in mineral wealth : **iron, lead, tin, zinc, copper, salt, &c.**, are widely diffused, and, what is of more importance, since the introduction of steam machinery, extensive beds of **excellent coal**. The deposits of coal, iron, and limestone are often found near each other, and are thus eminently suitable for manufacturing purposes.

5. CONFIGURATION OF THE COAST.—The coast line of Great Britain and Ireland exceeds 9,000 miles, that is, about four times as long as the coast of France. This great length of coast is broken up by many indentations, so that no part of the interior is far from the sea. Numerous and excellent harbours afford splendid facilities for shipping, and the high tides of the coasts enable large vessels to be taken far up its river estuaries. In the widest part of Great Britain the estuaries of the Severn, Thames, and Wash penetrate far into the land, so that no part of the island is more than 70 miles from the sea. The great ports of London and Hull, on the east coast, are only about 100 miles from the ports of Bristol and Liverpool on the west, while Grangemouth and Glasgow, although on opposite coasts, are no more than 25 miles apart.

6. SITUATION WITH REGARD TO OTHER COUNTRIES. But although its physical advantages give the United Kingdom a great superiority as a mining and manufacturing nation, these advantages could not have been fully utilised were it not for its favourable position. It is situated near the centre of the land hemisphere, and is within reach of all the great markets both for import and export. It is near all the commercial countries of Northern Europe, and is only parted from America by the Atlantic Ocean. The sea trade between Northern Europe and

the most important commercial centres of the world must pass its shores; hence London has become a great centre for the distribution of goods between various countries.

7. INSULAR POSITION.—The insular position of the British Isles has had an important effect on the climate, the character of the people, and the early history. A people living so near the sea became sailors of necessity. Although the 'silver streak' is not wide enough to hinder commerce, it is quite wide enough to prevent invasion; hence industrial pursuits can be carried on in safety, and we are spared the necessity of keeping up the huge armies and numerous fortresses that are maintained by Continental nations whose boundaries are not so effectual.

INDUSTRIAL PURSUITS.—Prior to the nineteenth century the principal occupation of the working population of Great Britain was agriculture, but since the great development of our manufactures the larger part of the population have been engaged in manufacturing, mining, and commercial pursuits. In Ireland, however, agriculture is still the chief occupation of the people. This is further borne out by the fact that in England and Wales 80 per cent. of the population is urban, and only 20 per cent. rural; in Scotland 72 per cent. is urban, and 28 per cent. rural; while in Ireland only 25 per cent. of the population resides in town of over 10,000 inhabitants (Census, 1911). The relative importance of the **principal occupations** of the United Kingdom, as regards the number of people engaged in them, is shown in round numbers by the following summary for 1911:—

	England	Scotland	Ireland
Industrial Class	9,468,000	1,226,000	613,000
Agriculture and Fishing . .	1,260,000	227,000	780,000
Commercial	2,214,000	283,000	111,000
Domestic	2,121,000	201,000	170,000
Professional	714,000	81,000	141,000

The principal mining industries of the United Kingdom, as shown by the value (in round numbers) of the produce in 1921-22, are:—

	£		£
Coal	213,746,000	Limestone	2,362,000
Iron Ore	2,209,000	Slate	2,145,000
Clays	1,760,000	Oil Shale	902,000
Sandstone	1,323,000	Salt	1,633,000
Igneous Rocks	3,199,000		

The principal manufacturing industries, as shown by the value of the exports (in round numbers) for 1922, are :—

	£
Cotton and Cotton Yarn	186,000,000
Manufactured Metals, &c. (chiefly iron)	61,000,000
Woollen	46,000,000
Machinery	11,000,000
Chemicals, Dyes, Colours, &c.	14,000,000
Linen	7,069,000
Apparel, &c.	22,000,000
Food and Drink	20,000,000
New Ships	30,443,000

FIG. 87.—TOTAL TRADE OF CHIEF COUNTRIES FOR 1923.

United Kingdom £1,800,000 mills.

United States £1,200,000 m.

France £580 m.

*Japan
£350 mills.*

*Germany
£330 mills.*

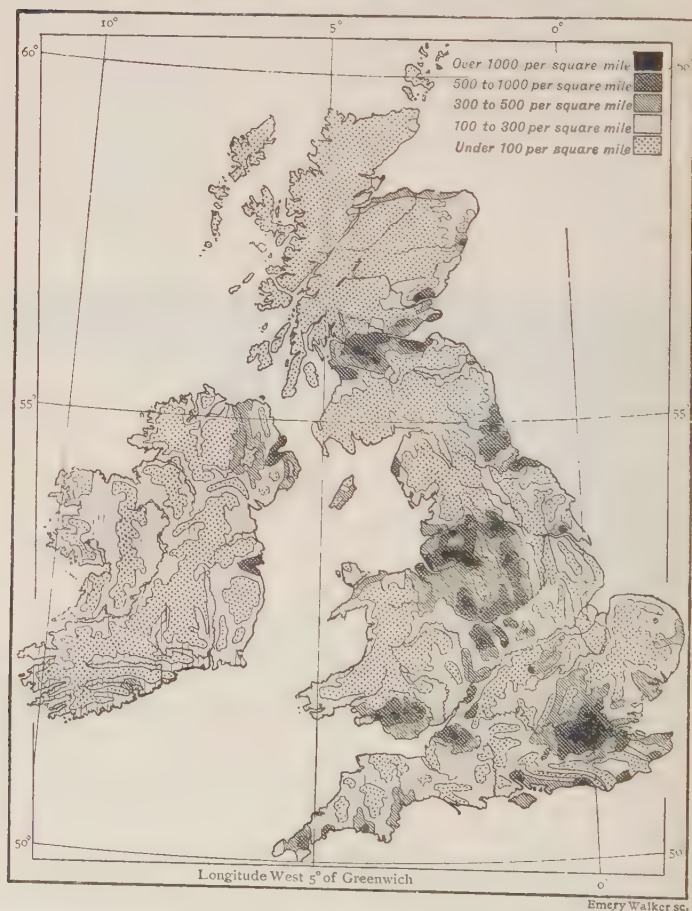
The great extent of our commerce is apparent from the fact that in 1923 the total value of the imports into the United Kingdom was over 1,098,000,000/., and of the exports of British produce to other countries 767,000,000/., and re-exports, 118,000,000/. To carry on this enormous traffic there was in 1920 a fleet of over 10,000 sailing and steam vessels, capable of carrying 11,000,000 tons, and employing over a quarter of a million of seamen.

FISHERIES.—The value of the fish landed in the British Isles in 1922 was over 18 million pounds, and about 85,000 persons were employed.

POPULATION.—The total population for 1921 is 47,157,000—that is, about 388 per sq. mile (England and Wales 37,885,000, Scotland 4,882,000, Ireland 4,382,000). The only European countries with a greater density of population are Holland, with 554, and Belgium, with 590 per sq. mile. At the census of 1921, the density of England and Wales was 649, for Scotland 164, and for Ireland 134.

In England this great population is chiefly situated on the coal-fields and in the neighbourhood of London; in Scotland in the district between the Forth and Clyde, the Highland districts being very scantily peopled

FIG. 88.—BRITISH ISLANDS : DENSITY OF POPULATION.



(a considerable portion less than 10 per sq. mile). In Ireland the population is much more evenly distributed; it is only in the district around Dublin, and in the north-east, that the population exceeds 200 per sq. mile.

PEOPLE.—The inhabitants of the British Isles consist mainly of two distinct branches of the Aryan race, the Celtic and

Teutonic, each of which may be sub-divided into groups corresponding to the time at which they invaded and settled in the islands.

Prior to the Celtic invasion the British Isles were peopled by a branch of the short dark race which once occupied Western Europe, and which is now represented by the Basques of Northern Spain, and possibly by some of the Welsh and Irish.

GOVERNMENT.—The British Empire consists of :—1. The United Kingdom of Great Britain and Northern Ireland. 2. The Irish Free State. 3. India. 4. The Colonies, Protectorates, and Dependencies.

1. The form of government is that known as a **Limited Monarchy**. The Sovereign is the head, and the succession to the throne is hereditary. All laws and public measures must have the consent of the Sovereign and of both Houses of Parliament. These laws and measures are carried out by a body of ministers, who are responsible to Parliament for their actions. Parliament consists of **two Houses of Legislature**, the **Lords** and the **Commons**.

The **House of Lords** consists of **English peers** (hereditary and by creation of the Sovereign), **English bishops** (members while in office), **Irish peers** (elected for life), **Scotch peers** (elected for the duration of Parliament), amounting in 1919 to a total number of 680.

The **House of Commons** consists of members elected by ballot, representing the counties and parliamentary boroughs. The total membership is 707.

2. The government of **India** has been vested in the Crown since 1858, and the King of England is its **Emperor**. Indian affairs in the British Parliament are under the special charge of the **Secretary of State for India**, who is assisted by a **Council of advisers**. For direct rule in India the Emperor appoints a **Viceroy** who bears the title of **Governor General**. He presides over two councils :—1. The **Viceroy's Council**. 2. The **Legislative Council**.

3. The **Colonies** form two classes : (1) **Crown Colonies**, which are governed directly by officers appointed by the Crown ; (2) those having responsible governments, where the Crown appoints the Governor and keeps a veto on legislation, but possesses no control over public officers.

	Area in sq. miles	Population	Date of acquisition
IN EUROPE.			
British Isles	121,633	47,300,000	—
Gibraltar	2	21,000	1704
Malta and Gozo	119	213,000	1814
IN ASIA.			
India	1,802,000	319,000,000	1757-1895
Ceylon	25,332	4,680,000	1796
Straits Settlements	1,600	882,000	1785-1824
Federated Malay States	27,506	1,326,000	—
Hong Kong Territory	391	625,000	1841
Aden, Perim, Socotra	10,300	55,000	1839
Cyprus	3,584	311,000	1878
Protectorates in Borneo, the Malay Peninsula, and Arabia)	120,400	1,200,000	1846-88
IN AFRICA.			
Cape of Good Hope	276,995	2,500,000	1806-1894
Natal, including Zululand	35,290	1,194,000	1843
Orange Free State	50,400	528,000	1900
Transvaal	110,426	1,685,000	1900
South-West Africa	322,000	165,000	—
Basutoland	11,716	405,000	1871
Bechuanaland Protectorate	275,000	127,000	1885
Gambia	4,134	209,000	1631
Sierra Leone	31,000	1,500,000	1787
Gold Coast	80,000	2,078,000	1663-1871
Nigeria	336,000	18,500,000	—
Rhodesia	440,000	1,736,000	—
Nyasaland Protectorate	39,000	1,200,000	—
Uganda Protectorate	110,000	3,066,000	—
Kenya Colony Protectorate	200,000	2,376,000	—
Tanganyika Territory	365,000	4,122,000	—
Swaziland	6,678	134,000	—
Somaliland Protectorate	68,000	310,000	—
Mauritius	809	385,000	1810
St. Helena	47	3,520	1673
Ascension	35	430	1815
IN AMERICA.			
Canada (Dominion of)	3,729,665	8,788,000	1759
Newfoundland and Labrador	162,200	260,000	1713
Bermudas	20	22,000	1612
British Honduras	8,598	45,000	1670
British Guiana	90,000	298,000	1803
West India Islands	12,409	1,800,000	1605-1803
Falkland Islands, &c.	7,500	3,275	1833
IN AUSTRALASIA.			
Australia (Commonwealth of)	2,974,581	5,437,000	{ 1787 1803
Tasmania	26,215		
New Zealand (Dominion of)	104,751	1,219,000	1841
New Guinea	90,540	277,000	1884
Fiji	7,083	157,000	1874
Total: Area, 13,356,000 sq. miles; population, about 449,000,000			

2. Navy.—The British Navy is more powerful than that of any other country, but no figures can be given as in both ships and men the Navy has been much enlarged during the war.

DOMINIONS OF THE BRITISH EMPIRE.—The area and population in round numbers of the principal portions of the British Empire may be seen from the table on page 118.

EXAMINATION PAPERS

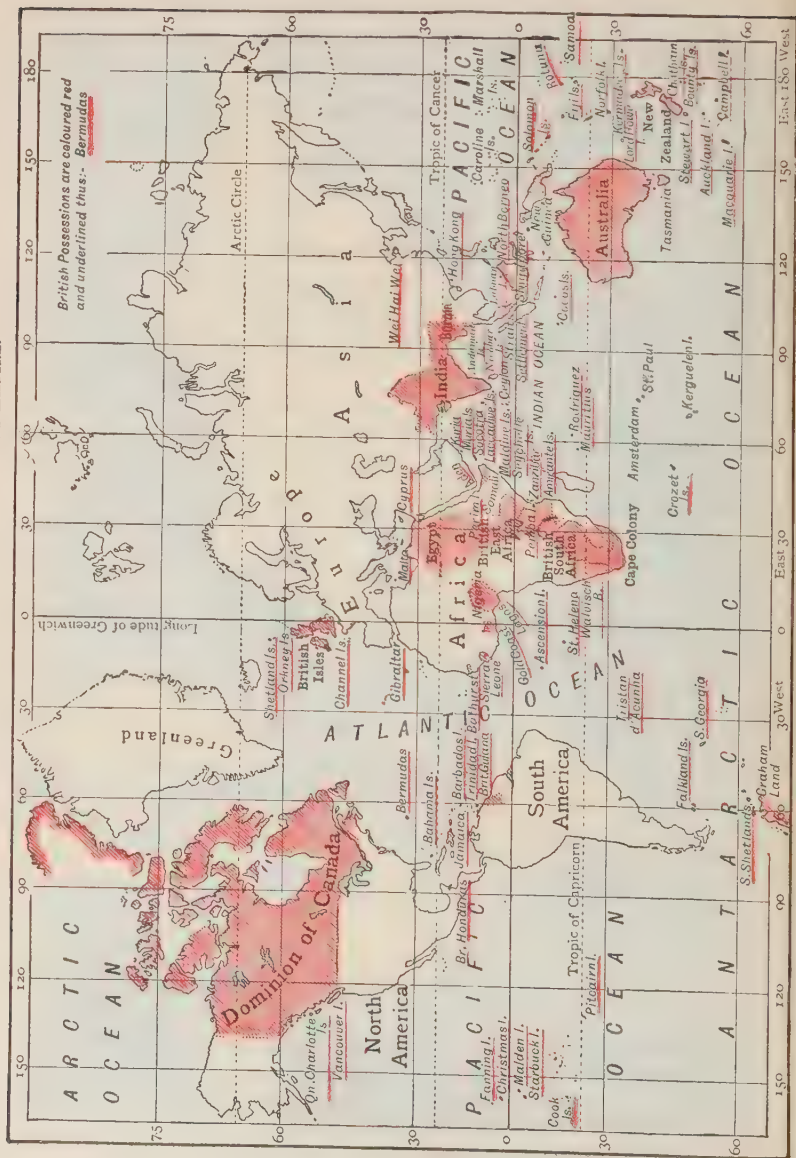
- A. 1. What facts may be mentioned to show that the British Isles once formed part of the mainland of Europe?
 2. Mention the chief dimensions of the two largest islands?
 3. What natural advantages have helped to make the British Isles the home of a powerful nation?
 4. Compare the climate and rainfall of the British Isles with other countries in the same latitude.
- B. 1. Give the main features in the relief of Great Britain and Ireland.
 2. Where are the most fertile portions of the British Isles situated? What are the chief crops?
 3. Show how the configuration of the coast line facilitates commerce.
 4. How does the situation of Great Britain affect her trade with other countries?
- C. 1. What are the chief occupations in (1) England, (2) Scotland, (3) Ireland?
 2. Mention the chief manufacturing industries in order of importance.
 3. How is the population distributed in the British Isles? Give the densities of the three chief divisions.
 4. Why is the southern part of Great Britain so much more thickly peopled than the northern?
- D. 1. What natural causes lead to Ireland being mainly an agricultural country?
 2. Say what you can of the government of—(1) British Isles, (2) India.
 3. Why is it essential for the United Kingdom to possess a powerful fleet?
 4. Give the chief British possessions in each continent.

ENGLAND AND WALES

POSITION AND BOUNDARIES.—England occupies the southern part of the island of Great Britain, of which it is the larger (embracing about two-thirds of the island), richer, and more important part.

It is bounded on the north by Scotland; on the east by the

FIG. 89.—THE WORLD, SHOWING BRITISH EMPIRE.



North Sea; on the south by the **English Channel**; and on the west by the **Atlantic Ocean**, **St. George's Channel**, and the **Irish Sea**.

The boundary line between England and Scotland starts from the Solway Firth, runs through a tract of waste land, formerly a morass known as the Solway Moss, continues along the Cheviot Hills for over 30 miles, then turns northward to the river Tweed, and finally terminates a little north of the town of Berwick—a total distance of over 80 miles.

SIZE.—The area of England and Wales, including the Isle of Man and the Channel Isles, is 58,611 sq. miles (England 50,867, Wales 7,442, the Isle of Man 227, and the Channel Isles 75 sq. miles).

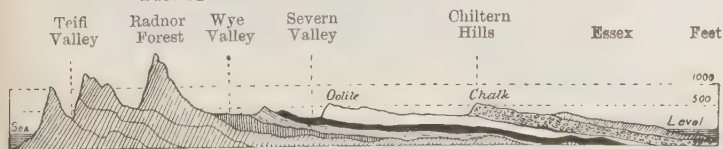
The greatest length is 423 miles, from **Berwick**, the most northerly, to the **Lizard**, the most southerly point.

The greatest breadth is 364 miles, from **Lowestoft Ness**, the most easterly, to **Land's End**, the most westerly point.

The country gradually decreases in width from south to north. Between the South Foreland and Land's End it measures 320 miles; between the coast of Suffolk and Cardigan Bay, 240 miles; between the coasts of Lincoln and Lancashire, 120 miles; while at the narrowest part, between the Solway Firth and the mouth of the Tyne, it is a little over 60 miles.

RELIEF.—In England, less than one-fifth of the surface is waste land; it is therefore evident that much of its surface cannot be mountainous. In fact, the surface of England, though very varied by hills, undulating ground, and plains, is but slightly elevated. If the land were lowered 500 ft. the only portions remaining above water would be two large islands—one covering the district now occupied by the Pennines and the Cumbrian Group, the other that covered by the Welsh mountains; a smaller one would be formed by the highlands of North-eastern Yorkshire, while a number of smaller islands would be scattered over the district lying to the south-west of a line drawn from Dover to Derby. The main elevation of the land is on the western side, with a gradual, but not a continuous, slope towards the east.

FIG. 91.—SECTION ACROSS ENGLAND AND WALES.



In proceeding from east to west the older rocks crop out in succession at the surface, the softer ones forming plains and

FIG. 90.—ENGLAND AND WALES: RELIEF.



valleys, while the harder stand out as ridges of hills; thus, rocks which form the elevations of the west dip below the newer formations towards the east, as shown in the figure.

Three main lines of elevation are formed where these harder rocks crop out.

1. **The mountainous districts of Western England**, which are composed of a great variety of hard rocks such as granites, grits, sandstones, &c. Here the hills are rugged and irregular in outline, the softer rocks having worn away, and the continuity is broken by the two wide gaps formed by the mouth of the Severn and the plain of Cheshire. This line of elevation includes the **Hills of Cornwall and Devon**, the **Mendip Hills**, the **Malvern Hills**, the **Welsh Mountains**, the **Pennine Chain**, and the **Cumbrian Group**.

2. **The Oolitic Escarpment**.—The surface falls gradually from these western elevations until what is known as the **oolite** (so-called because the rocks are formed of grains resembling the eggs in the roe of a fish) crops out. These rocks do not weather so readily, and, where they come to the surface, present a steep escarpment on the western and north-western side, with a gentle slope towards the east and south-east.

They are composed mainly of limestones and clays, and furnish valuable building stones. This ridge begins on the borders of Devon and Cornwall, and extends in a generally north-eastern direction by the Cotswold Hills, along the borders of Oxfordshire, through Northampton and Rutland, along the Lincolnshire Heights, to the moors of the North Riding of Yorkshire.

3. **The Chalk Escarpment**.—From the Oolitic Escarpment, the surface slopes gently until the chalk ridge crops out, which also presents a steep face towards the north-west and west, with a gentle slope on the south-east and east. This ridge also begins in Dorset, and strikes in a north-easterly direction by Salisbury Plain, the Chiltern Hills, and the East Anglian Heights to Hunstanton; here the Wash makes a gap, the ridge re-appearing in the Lincolnshire Wolds and the Yorkshire Wolds. From Salisbury Plain two great spurs are thrown off towards the east, the North Downs ending at Dover, and the South Downs at Beachy Head.

1. **The mountainous districts of the west** may be divided into four principal systems, with several smaller ranges:—

1. **The Pennine Chain**.—This is an upward district, from 1,000 to 3,000 ft. in height, forming a succession of hills and high moorlands having a width in places of forty miles, and extending from the narrow depression between the Tyne and the Eden to

FIG. 92.—ENGLAND AND WALES: HILLS AND PLAINS.



FIG. 93.—THE PENNINE CHAIN, &c.



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the valley of the Trent. This elevated mass forms, as it were, the backbone of Northern England. It slopes more gradually on the eastern than on the western side, and towards the south culminates in a group of high rounded hills, called the Peak, from which spurs are thrown out towards the south, gradually sinking until they are lost in the Central Plain.

The chief peaks are :—**Cross Fell**, 2,890 ft. ; **Mickle Fell**, 2,590 ft. ; **Whernside**, 2,400 ft. ; **Ingleborough**, 2,370 ft. ; **Pen-y-Gent**, 2,270 ft. ; **Kinderscout**, in the Peak, 1,980 ft.

The greater part of these uplands consists of desolate moors, broken here and there by deep and lovely dales, where agriculture is carried on. Formerly, when the lower slopes were covered with woods, the Pennines formed for centuries an affective barrier to intercourse between the people living east and west of them. Along the line of the Pennines great upheavals of the strata have brought rich coal-fields near the surface, and the moorlands of Lancashire with its cotton industry, and of Yorkshire with its woollen and iron industries, have consequently become the great workshops of the world.

2. The Cumbrian Group.—West of the Pennine Chain, and connected with it by a ridge known as **Shap Fell**, lies a group of mountains occupying parts of the counties of Westmorland, Cumberland, and Lancashire. This group is composed of older rocks than the Pennines, the hills being mostly of igneous formation, and showing in places remains of extinct volcanoes. From the central portion of the group high and rugged peaks rise, and deep valleys, containing lovely lakes, radiate in all directions. Windermere and Coniston stretch to the south, West Water south-west, Ennerdale to the west, Buttermere and Crummock Water north-west, Derwent Water and Bassenthwaite north-west, Thirlmere and Ulleswater north-east.

The chief peaks are :—**Scaw Fell**, 3,161 ft. (Scand., Scaw, a promontory, and *Fell*, a mountain) ; **Helvellyn**, 3,118 ft. ; **Skiddaw**, 3,054 ft. ; **Bow Fell**, 2,960 ft. ; and **Great Gable**, 2,950 ft.

The district covered by this group is known as the Lake District, and contains the most beautiful scenery in England. The valleys are well wooded, but the mountain-tops and plateaux have only a covering of grass and heather. There is but little agriculture, though large numbers of sheep are kept. Among the minerals found is **graphite** at Borrowdale (now but little worked), and on the outskirts of the group are important deposits of iron near Barrow, and of coal and iron near Whitehaven. The main roads between Western England and Scotland have for ages passed over Shap Fell ; and at the present time the Midland and London and North-Western Railways follow the same route.

3. **The Welsh Mountains.**—This system covers nearly the whole of Wales, extending in the south towards the Severn. It consists of wide stretches of barren moorlands, broken up by masses of rugged hills. The system is on the whole highest towards the north, and is composed of old rocks like those of the Cumbrian Group; Snowdon and Cader Idris are both of volcanic formation. The mountains are more continuous on the western side, the larger valleys opening towards the east; and the Dee, Severn, Wye, though rising near the west, make a considerable circuit before reaching the sea. The principal portions of the system are the **Snowdon Range**, the **Berwyn Mountains**, the **Plynlimmon Range**, and the **Black Mountains**.

The chief peaks are :—**Snowdon**, 3,570 ft. (Celtic, *dun*, a hill), the highest point in the southern portion of Great Britain; **Carnedd Llewellyn**, 3,480 ft.; **Carnedd Davydd**, 3,430 ft.; **Aran Mowddwy**, 2,970 ft.; **Cader Idris**, 2,900 ft. (the chair of Idris or Arthur); **Brecknock Beacon**, 2,900 ft.; and **Plynlimmon**, 2,470 ft.

Most of the mountain region is only fitted for sheep pastures; but some of the deep and sheltered valleys, such as the Vale of Clwyd and the valleys of the Wye and Usk, are well tilled, and contain some beautiful scenery. Slate, coal, and iron are distributed throughout the system, and south of the Black Mountains lies the rich coal-field of South Wales.

4. **The Hills of Devon and Cornwall.**—These consist of three main portions. (1) The wild and bare stretch of moorland known as **Exmoor**, which rises steeply from the Bristol Channel, many of the peaks being over 1,000 ft. in height. Here the red deer is still found wild, and lovely little ravines called ‘combes’ open towards the Bristol Channel. **Dunkery Beacon**, 1,700 ft., is the highest point. (2) To the south of Exmoor, and separated from it by excellent pasture land, lies the rugged and barren plateau of **Dartmoor**, which is largely composed of granite hills interspersed with stretches of bog. Many rivers rise in this plateau, which also contains mines of tin, copper, lead, and quarries of building-stone. The principal peaks are **Yes Tor**, 2,040 ft., and **Cawsand Beacon**, 1,800 ft. (3) To the west of Dartmoor the land falls to the valley of the Tamar, and then rises again to the **Cornish Heights**, a succession of granite hills and moorlands running through the county and terminating in the granite rocks of the Land’s End and the Scilly Isles. The veins of tin, copper, zinc, and lead have long formed the chief wealth of the county. **Brown Willy**, 1,368 ft., is the highest point.

5. Belonging to the western elevations are the following minor ranges: the **Quantock Hills**, 1,270 ft., and the **Mendip Hills**, 1,067 ft., in Somerset.

The latter contain lead and zinc and present some fine scenery. To the west of the Severn, on the borders of Herefordshire and Worcestershire, the **Malvern Hills** rise to a height of 1,400 ft. Further north in Shropshire are the **Clee Hills**, 1,800 ft.; the **Longmynd**, 1,680 ft.; and on the east of the Severn the **Clent Hills**, 1,023 ft., and the isolated hill called the **Wrekin**, 1,320 ft.

II. The Oolitic Escarpment.—This ridge is not nearly so elevated as the western mountain district, and in places sinks almost into the plain. The hills are more rounded and regular in shape.

The chief hills formed by it are: the **Blackdown Hills**, 1,160 ft., on the borders of Devon and Somerset; the **Cotswold Hills**, 1,134 ft., in Gloucestershire, which present a steep front to the valley of the Severn, but slope gradually away to the east, and afford good pasturage for sheep; **Edge Hill**, 800 ft., a ridge on the borders of Warwickshire and Oxfordshire; the **Lincoln Heights**, or **High Dyke**, extending from the borders of Rutland to the Humber; and the **North York Moors**, which rise in **Bolton Head** to a height of 1,489 ft.

III. The Chalk Escarpment.—This is the lowest of the three main lines of elevation, the highest points not exceeding 1,000 ft. The chalk hills are smooth and rounded in outline, bare of trees, and covered with short grass which supports large flocks of sheep.

Starting from Dorset, the most important portions of the ridge are: **Salisbury Plain**, 700 ft., an extensive upland district; **Marlborough Downs**, 960 ft., the steep northern edge of which borders the fertile Vale of the White Horse; the **Chiltern Hills**, from 900 to 300 ft.; the **East Anglian Heights**, from 300 to 60 ft., extending to Hunstanton; the **Lincolnshire Wolds** and the **Yorkshire Wolds**, terminating in the bold cliffs of **Flam-borough**, which reach in places an altitude of 400 ft.

Three large gaps are cut through this ridge—the first by the Thames, the second by the Wash, and the third by the Humber.

From Salisbury Plain a great spur is thrown off towards the east, dividing into two branches—the **North Downs**, which run through Hampshire, Surrey, and Kent, and terminate at the cliffs of Dover, 375 ft.; and the **South Downs**, extending through Hampshire and Sussex to **Beachy Head**, a bold promontory rising 564 ft. above the sea.

The highest points in the Downs are: **Inkpen Beacon**, 972 ft., in Hampshire; and **Leith Hill**, 967 ft., in Surrey.

PLAINS.—The lowlands lying to the east of the Pennines and Welsh mountains really form part of the great plain which stretches eastwards across the continents of Europe and Asia to the Pacific. The Oolitic and Chalk Escarpments, however, divide this lowland district into several smaller plains, which are as a rule associated with some river valley. The chief plains are :—

1. **The Vale of York.**—This plain covers an area of about 1,000 sq. miles, and is drained chiefly by the Ouse. It lies between the Pennines on the west and the York Moors and Wolds on the east, and includes towards the north the lower valley of the Tees.

This rich agricultural district was early settled, and many of its towns (York, &c.), though at one time famous, have been left behind by the West Riding towns, which derive their wealth from their manufactures. Long narrow valleys, frequently of great beauty, penetrate into the highlands on either side. Of these, the **Vale of Pickering**, on the eastern side between the Wolds and the Moors, is the largest.

2. **The Midland Plain.**—This stretches from the southern terminations of the Pennine Chain to the edge of the Oolitic Escarpment, through the counties of Nottingham, Derby, Leicester, Stafford, and Warwick. It is drained by the Trent, and is the most elevated of the larger plains, its surface lying from 200 to 500 ft. above the sea-level.

In places slight elevations such as Cannock Chase, Charnwood Forest, &c., rise from its surface. It is rich in natural resources, much of its soil is fertile, and in places it abounds in minerals. The chief coal-fields of Central England are situated on this plain.

3. **The Western Plain.**—This may be regarded as a westerly extension of the Midland Plain. It extends through Cheshire and South-eastern Lancashire, and is drained by the rivers flowing into the estuaries of the Mersey and Dee.

The northern portion of this plain contains the great Lancashire coal field, and is one of the most densely peopled parts of England; the southern part is rich agricultural land, while the south-western part affords our chief supply of salt.

4. **The Valleys of the Ouse and Upper Thames.**—This plain lies between the Oolitic and Chalk Escarpments, which in places are so low that they hardly separate it from the Midland and Eastern Plains. Towards the north it opens out into the low-lying Fen district, the flattest part of England.

The Fens at one time consisted of wide stretches of shallow water dotted here and there with islands, and upon such islands the great monastic foundations of Ely, Peterborough, and Crowland were built. It was not until the seventeenth century that the great drainage scheme was carried

out, by which 700 sq. miles of cultivable land was reclaimed. These new lands are called the **Bedford Level**, from the fact that the work was carried out by two successive Earls of Bedford.

5. The Eastern Plain.—This is bounded by the North Downs on the south, and by the Chalk Escarpment on the north-west, and stretches through the counties of Norfolk, Suffolk, and Essex, and the lower part of the Thames Valley.

This plain embraces some of the richest land in the country, and is almost entirely agricultural.

6. Minor Plains.—Between the North and South Downs lies the valley of the **Weald**, a word meaning wood, the whole district being formerly covered with trees. The valley has been formed by the wearing away of the chalk, hence the steeper faces of both North and South Downs face north and south opposite to each other.

The **Vale of the Severn** includes the lower course of that river.

The **Hampshire Plain** embraces the district bounded by the chalk hills of Dorset, Hampshire, and Sussex.

The **Valley of the Eden** extends along the course of the river, widening out considerably towards the Solway Firth.

The **Plain of Holderness** is the portion of Yorkshire lying to the east of the Yorkshire Wolds. It is really a continuation of the low-lying district extending northward from the Wash.

Effects of the Position of the Mountains.—The size and position of the mountains has a very important bearing upon the agriculture and commerce, as well as upon the history of the country. The highest mountains being on the west intercept the moisture-laden winds from the ocean, causing a heavier rainfall in the less fertile parts, while the eastern and more fertile districts, being drier, are better suited for agricultural pursuits. The rivers also have a longer and more gentle course towards the east, and thus are more suitable for navigation. Before the advent of canals and railways, rivers played a more important part in trade; they were the natural roads by which merchandise was carried from one part of the country to another. Had the east of England been mountainous, with the main rivers flowing towards the west, commercial intercourse with the Continent would have been much more difficult.

The mountains of the west afforded a refuge for the early races who were driven from the fertile plains by the Teutonic invaders. It was due to the inaccessible character of the country that the Celts of Wales retained their independence for so many centuries, and that they have preserved their language and individuality as a people to the present time.

COAST-LINE.—The advantages which this country derives from the configuration and extent of its coast-line have already been indicated in connection with the British Isles. A broken coast-line and numerous good harbours afford great facilities for

FIG. 94.—ENGLAND AND WALES: RIVERS AND COAST LINE.



trade, and provide safe anchorages for shipping; hence Englishmen became good sailors, hardy, enterprising, and adventurous, trade sprang up, and prosperity followed.

The **general character** of the coast-line depends upon the relief of the land and the nature of the rocks composing its surface. In England the general slope is from west to east; hence the coast on the west is on the whole more elevated than that on the east. Again, the rocks are harder on the western side, and therefore resist the action of the waves better; the softer portions have been worn away, leaving the harder portions projecting into the sea, as in Cumberland, Carnarvon, Pembroke, and Cornwall. The eastern rocks, being softer and of a more uniform character, have worn more evenly. It must also be remembered that, as the separation between Great Britain and the Continent was due to a gradual sinking of the land, inlets would be formed by the sea flowing up the river valleys.

Length.—For its size, England has a very extensive coast-line. A straight line drawn from Berwick to the South Foreland measures about 350 miles, one from the head of the Solway Firth to Land's End about the same, while from the South Foreland to Land's End is about 320 miles, making a total distance for the three sides of over 1,000 miles; but so deeply is the coast indented that the total length of coast-line is about 2,400 miles—that is, one mile of coast to 22 square miles of surface.

This great proportion of coast-line is still more apparent when we compare England with the two great commercial nations of the Continent—France, which has one mile of coast to 79 sq. miles of surface, and Germany, which has a very much smaller proportion.

EAST COAST.—The east coast is low on the whole, and being washed by an inland shallow sea, is but little broken. The rocks are soft, and much of the land is of sand or clay, and easily worn away by the sea. The shores being low, were on that account easily accessible to Saxon and Danish robbers. From Berwick to Flamborough the coast is varied; where the harder rocks crop out, as at Bamborough, and where the Oolitic and Chalk ridges reach the Yorkshire coast, high precipices, some reaching an elevation of 600 ft., tower above the water. From Flamborough to Hunstanton the coast is exceedingly low, and in places on the Lincolnshire coast embankments are reared to prevent the inroads of the sea. The coast of Norfolk and Suffolk consists of sandy or shingle beaches and low cliffs, followed by the low sand and mud flats of the estuary of the Thames. From the North Foreland to Folkestone, where the North Downs reach the coast, the chalk cliffs have an elevation of over 350 ft.

From Flamborough to the Humber, and on the Norfolk and Suffolk coasts, the sea is constantly wearing away the soft cliffs, whole villages having disappeared within comparatively recent times. In other places, as on the Lincolnshire coast, the land gains on the sea, the material worn away from some places being washed ashore at others.

Openings.—The east coast is broken by three large openings: the **Humber**, the **Wash**, and the estuary of the **Thames**.

The **Humber** is the estuary of two large rivers, the Ouse and the Trent, and is of great commercial importance, much of the traffic connected with the great cotton, woollen, iron and coal industries being carried on through its ports of Hull, Grimsby, and Goole.

The **Wash**, a wide, shallow opening, is of little use for navigation. It receives the waters of four rivers—the Witham, Welland, Nen, and Ouse—and formerly extended much farther into the land.

The estuary of the **Thames** is the most important waterway in the British Isles. Its nearness to the continent of Europe, the regularity of its tides, and the depth of its channel, have made it from the earliest times the chief outlet and entry for traffic in the country, the port of London being the great receiving and distributing centre for the south and midland districts.

Branching from the estuary of the Thames are numerous small river mouths, only two of which are now of much use for shipping—the **mouths of the Medway and Stour**. In the north are other smaller but important openings, of which the **mouths of the Tyne and Tees** are the chief. These, with the **mouth of the Wear**, are the outlets for the coal and iron districts of the north-east through the ports of Newcastle, Shields, Sunderland, Stockton, and Middlesbrough.

There are numerous other small river mouths, which at one time were the homes of considerable trade, but are now of little use, owing to the increase in the size of ships, while the railways have taken the trade which was once carried on by small coasting vessels.

Capes.—The boldest headlands are those which are the termination of the ridges which cross the country. Thus **Flamborough Head**, 160 ft. (the cliffs near rise over 400 ft.), is the termination of the Chalk Escarpment. **Hunstanton Point** is where the Wash breaks through the same ridge. The **North Foreland**, 184 ft., and the **South Foreland**, 375 ft., mark the termination of the North Downs. **Spurn Point**, a low spit of land formed by the action of the tides; **Lowestoft Ness**, the most easterly point in England; **Orford Ness** in Suffolk, and the **Naze, Foulness**, and **Shoeburyness** (*ness, naze*=nose, Scand.) in Essex, are all low.

Islands.—The only islands are **Holy Isle** and the **Farne Islands**, off the Northumberland coast.

Sheppey and Thanet, on the Kentish coast, once islands, are not now entitled to the name. In Roman times the channel between Thanet and Kent, known as the Wantsum, was the chief passage for ships from Gaul to London.

Off the east coast lie numerous sandbanks, the largest of which, the **Dogger Bank**, a famous fishing ground, has a length of 300 miles. Farther south, sandbanks, which are sometimes dry at low tide, run parallel to the coast. Between these banks and the coast are deeper channels, to which access is gained from the outside by passages of deep water known as 'gats' (openings). Off the coast are two noted anchorages—**Yarmouth Roads**, between the sandbanks and the Norfolk coast, and the **Downs**, between the dangerous **Goodwin Sands** and the coast of Kent.

SOUTH COAST.—The south coast varies considerably from east to west, chiefly because of the greater variety of the rocks. In the eastern part it is mostly low, broken here and there by cliffs. The hills run parallel with the coast, and, as a rule, shelve gently to the sea. In Dorsetshire, where the oolitic ridges begin, the coast is bolder, the rocks are harder, and the cliffs are steeper. Then, for some distance, softer rocks appear, and the coast falls again, but rises towards the west in high and precipitous cliffs of older and harder rocks, cut by numerous deep indentations, forming safe harbours.

Openings.—The **Strait of Dover**, separating England from France, is only 21 miles across. The coast for over 100 miles is entirely unbroken and possesses no harbours, but at the back of the Isle of Wight, and branching from the channel known as the **Spithead** in its eastern part and the **Solent** in its western, are the two fine natural harbours of **Portsmouth** and **Southampton**.

Portsmouth Harbour, which is our oldest and most important naval port, possesses a large dockyard for the construction of war-ships, and is very strongly fortified. On Southampton Water stands the important commercial port of **Southampton**, the headquarters of several important lines of mail steamers.

The coast now makes a succession of five bends, the first of which contains **Poole Harbour**; the second forms the **Harbour of Weymouth**; the third forms a much larger curve, and contains the smaller inlets of the mouth of the **Exe**, **Tor Bay**, and **Dartmouth Harbour**; the fourth bend contains two excellent harbours, **Plymouth Sound** and **Falmouth Harbour**; while the fifth bend forms **Mount's Bay**, and contains the fishing town of **Penzance**.

Plymouth Sound is large enough to contain the whole of the British Navy. It is both a naval and commercial port, and is protected from the heavy seas of the Atlantic by a strong breakwater nearly a mile in length. Close by are the towns of **Devonport** and **Stonehouse**, the former of which contains large naval dockyards. Plymouth, lying farthest west of the naval ports, has been important since England began to develop her trade with more distant countries. All three towns are strongly fortified. Fourteen miles to the south is the famous **Eddystone Lighthouse**.

Falmouth Harbour has the two small ports of **Falmouth** and **Truro** situated upon two of its numerous creeks.

Capes.—**Dungeness** consists of a low shingly point formed by the tides, which have here added to the land. **Romney Marsh**, on its northern side, has been reclaimed from the sea. **Beachy Head**, the termination of the South Downs, is a bold headland, rising 564 ft. above the sea. **Selsea Bill** lies further west. **St. Catherine's Point** and the **Needles** are in the Isle of Wight; the latter consists of detached pillars of chalk, forming a well-known landmark for ships making for Southampton by the Solent. **St. Alban's Head**, 344 ft., on the Isle of Purbeck, and **Portland Bill**, which is connected with the mainland by a long range of shingle called **Chesil Bank**, mark where the oolitic limestone projects. **Start Point** and **Bolt Head**, 430 ft., are in Devon. **Lizard Point**, 186 ft., the most southerly, and **Land's End**, 60 ft., the most westerly point in England, are both composed of very hard rocks, the latter of granite. Between them the sea has worn away the softer rocks, forming Mount's Bay.

Islands.—The only important island is the **Isle of Wight**, which has a length of 22 miles and a breadth of 13 miles. It is crossed by a range of chalk hills, rising to a height of nearly 800 ft. Its mild climate causes it to be a great resort of invalids. **Cowes**, on an inlet opening towards Southampton Water, is a great yachting centre. **Ryde** and **Ventnor** are small health resorts.

WEST COAST.—The west coast is broken up by much larger openings than either of the other sides. These wide inlets are separated by great masses of high rocky land, which fall to the sea in steep cliffs of hard rocks. The coasts of Cornwall and Devon consist mostly of bold cliffs, worn into a multitude of quaint forms by the sea, and broken up by many small inlets; then follow the flat shores of the estuary of the Severn. The south coast of Wales is bold on the whole, and in some places grand. The coast on the west of Wales now continues bold and rocky to Great Orme's Head, after which it sinks to the Western Plain, and remains flat, with sandy or clayey shores, to the coast of Cumberland. Here it rises to the bold promontory of St. Bees Head, and then falls again to the shores of the Solway Firth.

Openings.—The west coast presents three large openings, the **Bristol Channel**, **Cardigan Bay**, and the **Irish Sea**, the northern and southern of which are broken up into several smaller openings.

The **Bristol Channel** lies opposite to the important estuary of the Thames, and affords a waterway into the heart of the country. Towards its upper end it narrows, and forms the estuary of the **Severn**. Its shores are broken by several bays, the chief of which are: **Barnstaple Bay** on the south, and **Swansea Bay**,

Carmarthen Bay, Milford Haven, and St. Bride's Bay on the north. This channel has long been a great commercial highway, and the two important seaports of **Cardiff** and **Swansea**, together with the smaller ones of **Bristol** and **Newport**, have sprung up on its shores.

Bristol, situated a few miles up the Avon, was for a long time the chief port for trading with the American Colonies; much of its trade has now been diverted to Liverpool and other ports lying near the great manufacturing districts. **Cardiff**, on the opposite side of the Channel, has grown marvellously of late years, and is the chief port for the export of the coal and iron of South Wales. **Swansea** is the chief seat of the copper-smelting industry. **Milford Haven** is a fine natural harbour, but is too far removed from the great centres of industry to possess much trade. It is almost landlocked, and is navigable for warships for about ten miles, while it is so capacious that all the navies of the world could ride in safety.

Cardigan Bay forms a wide curve between the rocky peninsulas of Pembroke and Carnarvon. It has no good harbours, and the districts near it are but thinly peopled.

The third great opening is broken up by five indentations, the estuaries of the **Dee**, **Mersey**, and **Ribble**, and the larger openings of **Morecambe Bay** and the **Solway Firth**. Between the island of Anglesey and Carnarvon is the narrow **Menai Strait**, with its high and rapid tides.

Only one of these openings, the estuary of the **Mersey**, possesses much commercial importance. All of the others are more or less obstructed by sand and mudbanks. On the **Mersey** has sprung up **Liverpool**, one of the greatest ports of modern times. It owes its importance to the fact that it has a good and safe harbour near to the densely peopled manufacturing districts of the Lancashire and Yorkshire coal-fields, and that it is favourably situated for carrying on the vast traffic which has sprung up with America.

Capes.—Most of the headlands of the west coast are high and bold. The chief are: **Hartland Point**, 350 ft., in Devon; the limestone headlands of **Worms Head**, 164 ft., and **St. Gwen's Head**, at each side of Carmarthen Bay; the hard volcanic rocks forming **St. David's Head** on the south, and **Braichy-y-Pwll**, 580 ft., on the north of Cardigan Bay; the bold promontories of **Great Orme's Head**, 670 ft., on the south, and **St. Bees Head**, 560 ft., on the north of the third great bend of the west coast. Between the two last-named capes are two low-lying points, **Formby Point**, in Lancashire, and the **Point of Air**, in Flintshire.

Islands.—There are two large islands—**Anglesey** and the **Isle of Man**—and several smaller ones, the chief of which are the **Scilly Isles**, **Lundy**, **Bardsey**, **Holy Isle**, and **Walney**.

Anglesey is separated from the mainland of Wales by the narrow **Menai Strait**, which is crossed by two great bridges—a suspension bridge for ordinary traffic, and a tubular bridge for the railway which runs to Holyhead. It has an area of 275 sq. miles, with a population of 50,000. The

surface is flat, the highest point being under 500 ft. Copper and coal are found, but the chief occupation is agriculture. Connected with Anglesey by an embankment is the smaller Holy Isle, upon which stands **Holyhead**, the chief steamboat station for Dublin.

The **Isle of Man** lies nearly in the centre of the Irish Sea, and has an area of 227 sq. miles, with a population of about 55,000. The surface is mountainous; **Snae Fell**, 2,034 ft., being the highest peak. The chief industries are agriculture, fishing, and lead-mining. The island is a great holiday resort for the manufacturing population of Lancashire and Yorkshire. The people are called **Manx**, a branch of the Celtic race, and still retain their own legislature. **Douglas**, **Castletown**, **Ramsey**, and **Peel** are the chief towns.

The **Scilly Isles**, a group of about 140 small islands and rocks, lie about 30 miles from the Land's End. Only six are inhabited, of which **St. Mary's** is the largest. The people are now chiefly engaged in fishing, and raising early flowers and vegetables for the London market. The climate is so mild that spring flowers come into bloom about seven weeks earlier than they do in England.

The **Channel Islands**, which lie close to the French coast, have remained a portion of the kingdom of England since the Norman Conquest. Their total area is 75 sq. miles, and their population 95,000. The coast scenery is very beautiful, and the climate mild. The people speak a form of ancient French, and carry on a considerable trade with England in fruit and vegetables. The chief islands are **Jersey**, **Guernsey**, **Alderney** (noted for small and graceful cows), **Sark**, and **Herm**. The largest town is **St. Helier**, in Jersey.

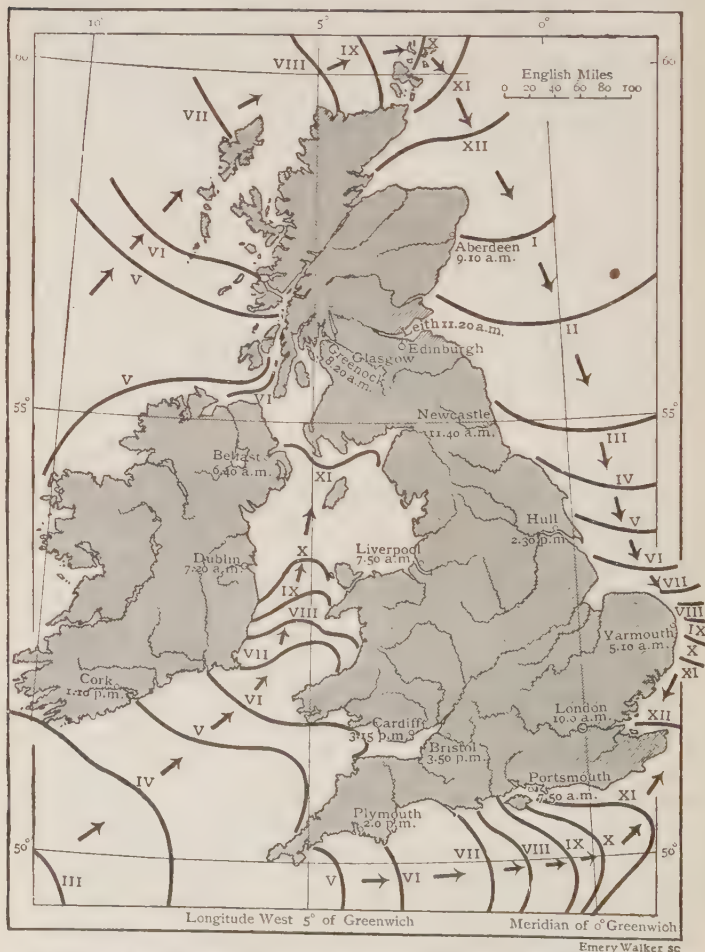
Tides of the Coast.—The tides are of great commercial importance, as by their aid ships are carried a considerable distance inland, while many ports would be inaccessible to large vessels were there not a considerable rise of tide. As a rule, the tides are highest on the west coast. This is due to the fact that the estuaries on this side open towards the advancing tidal wave from the Atlantic. This wave divides at the Land's End, one branch flowing up the west coast, while the other advances up the English Channel, through the Strait of Dover, as far as the Suffolk coast, where it meets a branch, which, after flowing by the western shores of the British Isles, turns round Scotland and flows south. The effect of the meeting of these tides is to make the difference between high and low tide very little at some places. The tides round the shores of England vary from about 6 ft. at Yarmouth to 50 ft. at the mouth of the Severn. Up the wide estuaries of the Bristol Channel, Morecambe Bay, and the Solway Firth the tide flows very rapidly, and as the estuaries narrow the water is piled up to a considerable height. In the Severn the advancing tide forms a big wave called a bore.

The ordinary rise of the tide for the following places is about as follows :—

West Coast	Bristol, 40 ft.	Cardiff, 33 ft.	Liverpool, 16 ft.
South Coast	Plymouth, 14 ft.	Portsmouth, 12 ft.	Brighton, 18 ft.
East Coast	London, 19 ft.	Hull, 18 ft.	Mouth of Tyne, 13 ft.

Lighting of the Coast.—The great extent of our maritime trade renders it necessary that the dangers of the coast should be well guarded against. No coast in the world is so well marked out by buoys, lightships, and

FIG. 95.—BRITISH ISLANDS: CO-TIDAL LINES.



In studying this map the difference between the hour figure on the Co-tidal line and the time of high water at a given port must be noted. The reason for such differences is the shape of the coast-line.

lighthouses. Every rock, shoal, and sandbank is marked on the charts and shown by buoys or lightships, while every dangerous headland, high or low,

has its lighthouse; even outlying rocks, such as the Eddystone, Wolf's Crag (8 miles from Land's End), the Bishop Rock (west of Scilly Isles), are surmounted by lofty lighthouses. The Corporation of the Trinity House look after the lighting of the coast. There are also many other lighthouses and lightships not under the control of the Trinity House.

CLIMATE.—The climate of a country depends, in the first place, upon its distance from the equator; that is, its **latitude**. There are, however, a number of important modifying circumstances, which are dealt with on pp. 60 and 61. England is situated in the Temperate Zone, is washed by the sea, has a prevalence of warm moist winds, and has, therefore, a temperate climate. If latitude were the only factor which determined the climate of a country, then, as has already been pointed out, England would have as severe a climate as Labrador.

If we consider the general causes which modify the climate of a country we shall find that they nearly all operate favourably with respect to the climate of England.

1. Proximity to Sea.—This tends to make the climate of England warmer in winter and cooler in summer, thus producing what is termed an 'insular climate'—that is, one in which there is not a great range of temperature.

2. Character of the Prevalent Winds.—The prevailing winds are from a south to a westerly direction. Taking the year all through, there are, as a rule, about two days when the wind blows from the south or west to one day from the east. The western parts of England, being nearer to the ocean, have a milder climate than the eastern; thus, in Cornwall the average temperature for January is 45° , whereas on the east coast it is only 38° . On the other hand, the summer in the south-east of England is warmer than in the west, the average temperature in the south-east for July being 64° . In the spring there are many days when the winds blow from the east. As these winds come across a wide stretch of land, they are both dry and cold, affording a strong contrast to the warm, damp winds which blow from the west and south-west.

3. Elevation.—Highlands are much colder than lowlands. The average elevation of England is low, hence the temperature is not decreased from this cause.

4. Position and Direction of the Mountain Chains.—Mountains act as barriers to winds. The highlands of England lie mostly in the west, and it is upon them that the winds discharge most of their moisture. There are places in the mountains of the west where the rainfall exceeds 80 inches in the year. On the other hand, the mountains of England are not high enough to

stop all the rain-bearing winds, and a sufficient quantity passes over them to the eastern uplands and plains, and supplies the rivers with an abundance of water.

The general direction of the chief mountain ranges is from north to south. The prevalent winds are from the west, and thus the mountains help to make the east of England drier than the west. This influence is clearly seen in the North of England, where the Pennines lie nearly in the centre and extend from north to south. The Lancashire Moors on the western side have an annual rainfall of from 45 to 50 inches, whereas the Yorkshire Moors on the eastern side have only from 30 to 35 inches.

In Scotland the same difference is noticeable; the rainfall varies from 50 to 80 inches in the west, and from 25 to 40 inches in the east. In Ireland the mountains are not so high, nor is their general trend from north to south; consequently the rainfall is more evenly distributed.

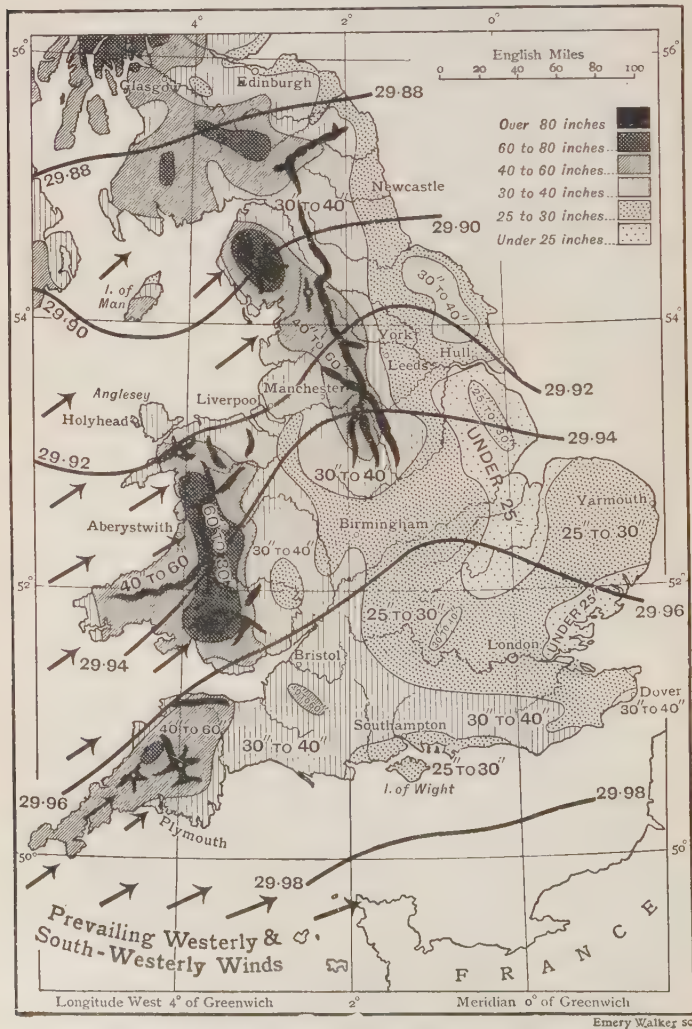
Rainfall.—The prevailing westerly winds, which blow over a large extent of ocean, are laden with moisture. These winds first burst upon Ireland, where the rainfall is greater than that of England, as it exceeds 50 inches a year over large areas. As the hills of Ireland are low, the winds lose only part of their moisture, and striking upon the west side of Great Britain, where the mountains are high, discharge their moisture as rain, hail, or snow. In Cornwall and Devon, the greater part of Wales, and in the district to the west of the Pennines, the rainfall exceeds 40 inches. In places among the hills of the Cumbrian Group it is as much as 80 inches. The driest part of England is the eastern district from the Humber to the Thames, where the yearly rainfall is 25 inches.

PRACTICAL EXERCISES.

1. Note the difference between the amount of rainfall on the E. and W. sides of the Pennines. How do you account for this?
2. Give the causes of the very heavy rainfall in Cumberland and north Wales.
3. Why is the rainfall of Pembrokeshire, Carnarvon, and Anglesey so much smaller than the interior of Wales?
4. Draw a line from Plymouth to Hull. From what you know of the rainfall and the relief of the land, what crops would you expect to find in the counties through which the line would pass?
5. Why is it that in winter the climate of Pembrokeshire is so much milder and in summer not so warm as in Suffolk, though both counties are in nearly the same latitude?
6. Why does the January isotherm run nearly north and south instead of east and west, as it would if latitude only determined climate?
7. What are the causes of the irregularity of the July isotherm of 60° in Pembrokeshire, Anglesey, Cumberland, and the east coast of Yorkshire?
8. How do you account for the great rise of tide at Bristol, and the small rise at Yarmouth?

RIVERS.—No country in the world has a better water supply than England. The rivers are not large, but owing to the facts that the country slopes from the west to the east, that

FIG. 98.—ENGLAND AND WALES: RAINFALL AND ISOBARS.

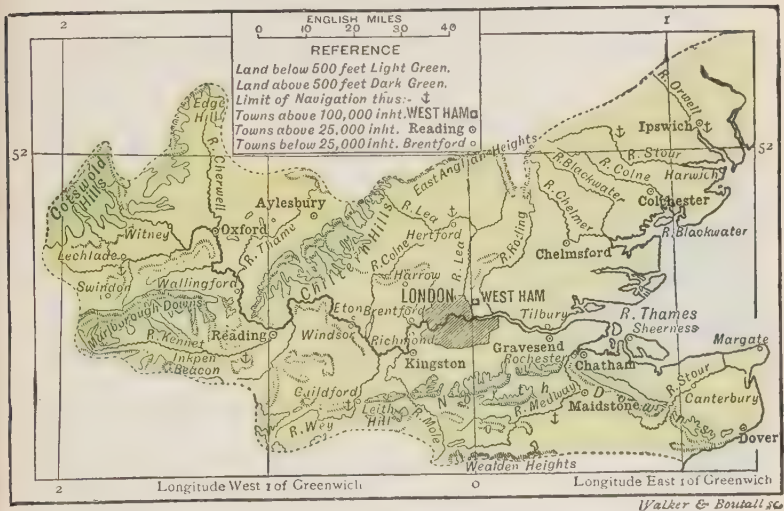


The thick lines show the position of mountain ranges, and must not be confused with the black patches that mark the rainfall.

the highest land and greatest rainfall are in the west, and that the middle and eastern parts of England consist of undulating lowlands, they flow slowly on the whole.

The rivers bring an abundance of water to the plains, drain the land, supply water-power for manufactures, give an easy means of communication from one part of the country to another, and in most cases their estuaries afford a safe anchorage for ships. They played an important part in the early history of England, for it was up these safe and slow-moving rivers that Saxons and Danes were able to penetrate into the heart of the country, always keeping their ships near at hand as a refuge in time of danger.

FIG. 99.—BASIN OF THE RIVER THAMES.



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Water-Partings.—1. The great **Central Water-Parting**, which divides the rivers flowing into the North Sea from those flowing into the Irish Sea and Bristol Channel. This water-parting follows the course of the **southern offshoot of the Cheviots**, along the **Pennines**, across the **uplands of Central England**, by way of **Cannock Chase**, follows the **Clent and Lickey Hills**, and is deflected to the **east** round the source of the **Avon**. It then bends **south-westwards** by **Edge Hill**, is continued along the edge of the **Cotswolds**, and is ultimately split up in **Salisbury Plain**.

2. The **Southern Water-Parting**, which divides the waters flowing into the **Thames** and **Bristol Channel** from those flowing into the **English Channel**. This water-parting is formed by

the high lands known as the **Wealden Heights**, the **Hampshire Downs**, **Salisbury Plain**, **Exmoor**, **Dartmoor**, and the highlands of **Cornwall**.

From a study of the water-partings it will be seen that there are **three great river systems**—

I. The rivers which drain the eastern side of the Central water-parting and flow into the North Sea.

II. The rivers which drain the western side of the Central water-parting and flow into the Irish Sea and the Bristol Channel. Among these are the rivers of Wales.

III. The rivers which drain the southern side of the Southern water-parting and flow into the English Channel.

In comparing the rivers of these three systems certain facts should be noticed. (1) that, as the high lands are mostly in the west, the rivers which flow to the west must have shorter courses than those which flow to the east. The chief exception to this is the Severn, which, though it rises near the west coast and flows for some distance to the east, empties itself into the British Channel. Further, most of the western rivers rise in high ground and have short courses, hence they are rapid, and therefore of but little use for navigation. (2) Most of the English rivers flow to the east, and having longer courses they drain more land, and so gather a greater volume of water before they reach the sea. Further, they are not so liable to sudden floods. (3) As they flow over softer soils, and discharge their waters into a shallow sea, the eastern rivers carry more *debris*, and are therefore more liable to have their estuaries silted up with sand or mud. (4) The southern rivers take their rise near to the sea; they have short and often rapid courses; they drain only a small extent of country, and are of little use for navigation.

I.—Rivers draining the eastern side of the Central Water-Parting.

(a) The chief of these is the **Thames**, which rises in the **Cotswold Hills** at a height of about 300 ft., and, as it has a length of about 215 miles, its course is necessarily slow. Hence it is navigable for nearly its entire length, and affords a water-way right across the country. It begins to be navigable at Lechlade, whence a canal has been cut that connects it with the Severn and the Bristol Channel. Its upper course lies in the low ground which is bounded by the Cotswolds in the west, Edge Hill in the north, and the Marlborough Downs in the south. It cuts through the chalk by means of a narrow valley formed by the approach of the Chiltern Hills to the Ilsley Downs, and its course then lies along a broad valley of clays bounded on the north by the Chilterns and the East Anglian Uplands, and on the south by the Hampshire Downs and the Wealden Heights. Two of its chief tributaries, the Wey and the Mole, cut their way from the Wealden Heights through the chalk of the North Downs. In its lower course the Thames flow

through a rich agricultural country, and finally opens out into a broad estuary, which extends for about 50 miles below London Bridge.

Its chief tributaries are :—On the left bank, the **Cherwell**, **Thame**, **Colne**, **Lea**, and **Roding**.

On the right bank, the **Kennet**, **Wey**, **Mole**, and **Medway**.

The Thames is not only the largest, but it is also the most important river in England. Flowing through a fertile and well-cultivated country, it has been an important water-way from the earliest times. Its estuary is wide and deep, and has regular tides, hence it is fitted for navigation by large ships. It is the natural outlet for the trade of the southern midland counties, and from its nearness to the Continent it is the natural inlet for all trade from France, Holland, and Belgium. Its estuary is in the centre of the great land hemisphere, and is at the point of intersection of lines of navigation from east to west and from north to south. Hence there has arisen a seaport which sends its ships all over the world, and where may be seen the flags of every nation.

(b) Between the Wash and the estuary of the Thames there are several small rivers having their sources in the East Anglian Heights and flowing into the North Sea. They are the **Chelmer**, **Colne**, **Stour**, **Orwell**, **Waveney**, and **Yare**. On most of them are small seaports, the importance of which has, in many cases, been much diminished by the increase in the size of ships and by the spread of railways.

On the south side of the Thames estuary is the **Stour**, which flows into the sea to the south of Thanet.

(c) **Rivers flowing into the Wash**.—These comprise a group of sluggish rivers—namely, the **Great Ouse**, **Nen**, **Welland**, and **Witham**.

These rivers together drain about one-ninth of the area of England. The **Welland**, **Nen**, and **Great Ouse** rise not far from each other in the uplands of Northampton, and flow sluggishly, with endless windings, through the Fen country, where, before the land was drained, their waters mixed together in the lakes and marshes.

The chief of these rivers is the **Great Ouse**, which has a course of about 150 miles. Its chief tributaries are the **Cam** and the **Little Ouse**. They all drain a purely agricultural country, and as the Wash, into which they flow, is too shallow to admit large ships, they are of little value for navigation.

(d) **Rivers of the Humber Basin**.—The valley of the Humber is the only opening for a great distance on either side in the long line of highlands which extend through Lincolnshire and the eastern side of Yorkshire. Hence it affords an outlet for rivers which drain a large extent of country, for while the **Ouse** drains the Plain of York, the **Trent**, which, with the **Ouse**, forms the Humber, gathers up the waters of the greater part of the Central Plateau. These two rivers together drain an area of about 10,000 sq. miles.

The **Ouse** (120 miles) and its tributaries have their sources in the eastern side of the Pennines or in the York Moors, and after escaping from the hills they drain the fertile Vale of York. The chief tributaries are the **Swale** and **Ure**, which united form the Ouse, the **Nidd**, **Wharfe**, **Aire**, with the **Calder**, and the **Don**

FIG. 100.—BASIN OF THE RIVER OUSE



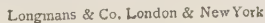
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on the right bank, and the **Derwent** on the left bank. The latter drains the slopes of the York Moors and flows across the Vale of Pickering.

In very early times the city of York became the centre of the trade of Yorkshire, for by means of the Ouse it had access to the sea. In later times, since great manufactures have sprung up in the west of Yorkshire, the numerous streams have been of the greatest use in furnishing water-

FIG. 101.—BASIN OF THE RIVER TRENT.



Walker & Bontall sc.

The **Trent** and its tributaries have their rise in the southwestern slopes of the Pennines, and drain the greater part of the Central Plain. It has a course of about 150 miles, for the greater part of which it is navigable, thus affording a waterway into the very heart of the country. Its chief tributaries are the

Dove and **Derwent**, which flow down from the Pennines and join it on the left bank, and the **Tame** and **Soar** on the right bank.

The Trent flows through one of the busiest parts of England. Its basin contains many coalpits and ironworks. There are huge breweries at Burton; lace and other manufactures at Nottingham; plenty of rich arable land; and workshops for the making of agricultural implements at Newark and Gainsborough. All these, combined with the manufactures of the districts drained by the Ouse, make up an immense trade, much of which finds an outlet seawards at the port of **Hull**, which is situated upon the Humber, and which also owes its importance partly to the convenience of its position for trade with the continent of Europe.

(e) The **Tees** (80 miles), which rises in the Pennines and drains the country between the York Moors and the uplands of Durham. Its estuary is near to the great iron-producing district of **Cleveland**, and so there have grown up the towns of Middlesbrough and Stockton-on-Tees.

(f) The **Wear** (70 miles) and **Tyne** (73 miles) also rise in the Pennines. The latter flows through a rich coal-field, and thus its estuary has become the centre of a great shipping trade, the seat of many industries, and the home of a large population. Newcastle, Gateshead, North and South Shields, Tynemouth, with other towns, form a busy centre of the shipping and ship-building trade and of many manufactures.

II.—**Rivers draining the west side of the Central Water-Parting.** The western rivers may be divided into three groups:

1. Those flowing into the Bristol Channel: by far the most important.

2. The rivers of Wales.

3. The rivers which drain the plain of Lancashire and Cheshire.

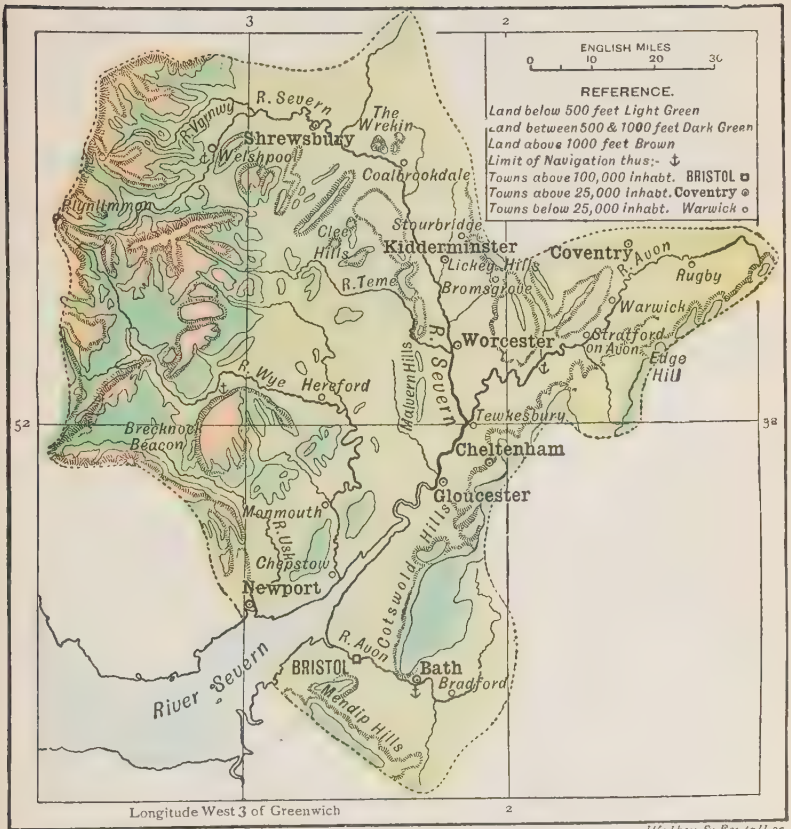
1. **Rivers flowing into the Bristol Channel.**—The largest is the **Severn** (200 miles), which rises in Mount Plynllymmon, not very far from the shores of Cardigan Bay. Its upper course lies in Wales, and, after flowing for some distance in a north-east direction, it bends towards the south, and flows along the outer edge of the hills and spurs that are thrown out towards the east from the mountains of Wales. Its lower course lies in a valley which is bounded by the Malvern Hills on the west and the Clent Hills and the Cotswolds on the east. Its chief tributaries are the **Vyrnwy** and **Avon** (Celtic: *Avon*, *Afon*=water: a river), which join it on the left bank; and the **Teme** on the right bank.

The upper waters of the Vyrnwy have been collected into an artificial lake, which gives Liverpool a plentiful supply.

The Severn and its tributaries drain an area of about 4,000 sq. miles. The middle portion of its course lies in a busy industrial district, while the

lower drains a well-cultivated agricultural country. By means of its tributaries and by canals it has water communication with the basins of both the Trent and the Thames. Its estuary is broad, and, though shallow, has so great a rise of tide that large vessels can reach Gloucester by means of a canal that cuts off the lower winding reaches of the river.

FIG. 102.—BASIN OF THE RIVER SEVERN.



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The **Wye** (135 miles) rises near to the source of the Severn, but at once takes a southerly direction, and for about half its course flows through the barren hills and moors of Mid-Wales. Emerging upon the fertile plain of Hereford, it flows through a country of well-kept farms and orchards, finally crossing the

Forest of Dean before entering the sea. It is famous for the romantic character of its scenery.

The **Usk** is a smaller river than the Wye. Rising in the Black Mountains, it flows through some of the grandest scenery in Wales.

Other rivers of the Bristol Channel group are the **Avon** and **Parret** on the south side, and the **Taff** on the north side.

2. Rivers of Wales.—The **Severn**, **Dee**, **Wye**, and **Usk** all have their sources in Wales and flow away from the mountains, generally in an easterly direction. But as they lie to the west of the great central water-parting of England, they find their way into the western seas.

There are also many streams having short and rapid courses which flow down the western slopes of the Welsh mountains. The chief of these are the **Towy** and **Teifi** in South Wales, and the **Conway** and **Clwyd** in North Wales.

3. Rivers of the North-west.—Of these the three largest are the **Dee**, **Mersey**, and **Ribble**, all of which enter the sea by wide estuaries which have been cut through low-lying lands. These estuaries are all more or less choked by sandbanks at their entrances.

The **Dee** (80 miles) rises in Wales, and flows through the lovely Vale of Llangollen. Its estuary is of but little use to shipping, as it is silted up with sand, and its trade has departed to the neighbouring estuary of the Mersey.

The **Mersey** is formed by the union of many small streams which rise in the Pennines, and though it is but a small river when it opens out into its estuary, still it has become second only to the Thames in importance. It flows through one of the most prosperous and densely-peopled parts of England, and the river has contributed largely to this prosperity. It crosses a rich coal-field, to which it has afforded not only a waterway, but has also provided power to drive machinery. Upon this coal-field there has sprung up a great industry in the manufacture of cotton, in the beginnings of which the river supplied the water-power which made the manufacture possible. With its tributary, the **Weaver**, it also waters a large part of the Plain of Cheshire, a rich agricultural district, and its estuary, which is easily accessible to Ireland and America, furnishes a safe harbour for ships. Here has grown up the city of **Liverpool**, the second seaport in England. Upon the quays of its magnificent docks there are landed vast quantities of cotton for the mills of South-east Lancashire, as well as all kinds of produce from nearly every country in the world. Behind the docks there are huge warehouses for the storage of corn, sugar, &c.

The **Ribble** rises in the Pennines, but is of little importance, as its estuary is too shallow to admit of the passage of large vessels.

The **Lune** and **Eden** rise near to each other; but whereas the former flows to the south and discharges into Morecombe Bay, the latter flows to the north and discharges into the Solway Firth.

The **Derwent** takes to the sea the waters of Keswick Lake and Basenthwaite.

III.—Rivers flowing into the English Channel. The rivers which drain the southern slopes of the water-parting are mostly small, and of little use for purposes of navigation.

They are the **Rother**, **Ouse** (Celtic, *uisce*=water), and **Arun**, which flow from the Weald.

The **Itchen** and **Test**, which drain the Plain of South Hants and flow into Southampton Water.

The **Avon**, which comes from Salisbury Plain and is navigable for a considerable portion of its lower course. It is joined where it enters the sea by the **Stour**.

The **Frome**, which opens out into Poole Harbour.

The **Exe**, which rises in Exmoor not far from the Bristol Channel and flows to the south.

The **Dart**, which flows from Dartmoor. Its lower course is a scene of romantic beauty.

The **Tamar**, which flows into Plymouth Sound.

The **Fal**, which flows into Falmouth Harbour.

Most of these rivers have seaports at their mouths, some of which were formerly of greater importance than they are now. The introduction of steam and the consequent increase in the size of ships, the spread of railways, and the growth of seaports nearer to the seats of great mining and manufacturing industries, have all contributed to the decadence of these old seaports. At one time **Rye** at the mouth of the Rother, **Poole** on the estuary of the Frome, **Dartmouth** on the Dart, and **Bideford** on the Torridge, ranked among the chief ports of the country.

LAKES.—The lakes of England lie among the mountains of Cumberland and Westmorland, where there is a very heavy rainfall, and the broken nature of the country affords deep hollows for the accumulation of water; hence the name **Lake District**. They are mostly small, and are famous for their lovely and romantic scenery. From the centre of the Cumbrian Group of mountains the lakes radiate in all directions. **Windermere** is about 10 miles long by about one mile broad. At its southern end the scenery is tame, but increases in grandeur towards the northern end, which penetrates deeply into the hills. **Windermere** and **Coniston** stretch from the central mountains towards the south; **Ullswater** to the north-east; **Thirlmere** to the north; **Derwentwater** and **Bassenthwaite**, **Buttermere** and **Crummock** to the north-west; and **Westwater** to the south-west.

So beautiful is this district that it is visited every year by thousands of tourists from many parts of Great Britain, from the United States, the Colonies, and many other countries. Here was the home of three of our great poets—Wordsworth, Southey, and Coleridge.

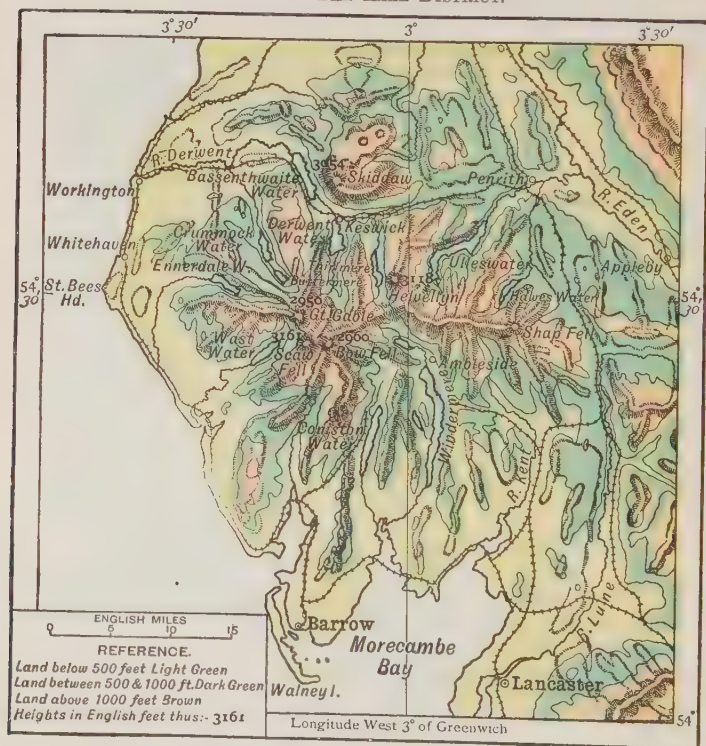
Among the Welsh mountains are many small lakes, called **llyn**s. **Bala Lake**, drained by the Dee, is the largest. **Llyn Conway** and the Lakes of

Llanberis lie around the Snowdon Group. Llyn Safaddu, near Brecknock, is the largest lake in South Wales.

In Norfolk are a number of shallow lakes known as **broads**, drained by the Yare and its tributaries.

FERTILITY OF THE SOIL.—During the course of ages the softer rocks of England have been worn down by the action of rain, wind, and frost. Hills have become rounded, and their

FIG. 103.—THE LAKE DISTRICT.



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softer parts washed down to the plains. The abundant rainfall has produced a vast number of streams and rivers, which have brought soil from the higher lands and deposited it upon the lowlands. Hence the south-eastern and midland parts of England are mostly very fertile. Nearly 80 per cent. of the whole surface of England has been brought under cultivation, the waste lands consisting of mountains and moors, lakes and rivers.

The area of England consists of 77 per cent. cultivated land and pasturage ; 4·8 per cent. of woods and coppices ; 18·2 per cent. of waste.

The result of an abundance of fertile soil, a temperate climate, and a sufficient rainfall has been that, from very early times up to a comparatively recent date, England was mainly an agricultural country.

PRODUCTS.—I. Agricultural.—The principal cultivated products are :

1. **Corn crops**, the chief of which are **oats, wheat, barley, beans, and peas.**

FIG. 104.—ENGLAND AND WALES: DISTRIBUTION OF CROPS.



2. **Green crops**, which include **hay, turnips, potatoes, man-golds, and hops.**

3. **Fruits.**—**Orchard** (apple, pear, cherry, plum, &c.), **small fruit** (gooseberries, strawberries, &c.).

Wheat is chiefly grown in the eastern and south-eastern districts, from Lincolnshire to Hampshire. **Barley** is grown chiefly in the eastern and midland districts. **Hops** are grown in Kent, Surrey, Sussex, Hants, Worcestershire, and Herefordshire. Orchard fruits largely in Devon, Somerset, Hereford, Kent, Cambridge, and Worcester.

The counties of Cheshire, Derbyshire, Leicestershire (Stilton), and Gloucestershire are noted for the making of cheese.

In England, agriculture employs more than 1,000,000 persons.

FIG. 105.—ENGLAND AND WALES: MINERALS.



II. Fisheries (1921).—The seas and rivers of England and Wales abound in fish, which furnish an important part of the food supply of the country. The total value in pounds sterling of the fish caught round our coast is nearly 16 millions, including salmon and sea-trout, and the industry affords employment for about 40,000 men. The principal fish caught are:—**Herring**,

mackerel, cod, haddocks, pilchards (off the Cornish coasts), flat fish (plaice, soles, turbot, halibut, &c.), shell-fish (lobsters, crabs, oysters, &c.), and salmon in many of the rivers.

The principal ports at which fish are landed are :—**London, Grimsby, Hull, Lowestoft, and Yarmouth.** Oysters are produced at **Whitstable** on the north coast of Kent, on the **Essex coast**, and at several other places.

III. Minerals.—The crust of the earth is made up of layers of rock of varying thickness and degrees of hardness. As a rule, the hardest rocks lie deepest down. But in England, by some convulsion of Nature, the various layers of rock have been upheaved, thus bringing to the surface almost all the different kinds of rock. Mineral treasures lie embedded in them, and, owing to the exposure of the rocks, they are near the surface.

The chief minerals found in England are, in the order of their importance—**coal, iron, stone (sandstone, granite, &c.), slate, tin-ore, salt, fire-clay and other clays, lead-ore, zinc-ore, and copper-ore.**

1. The **coal-fields** are in most cases close to the sea, or in districts with which communication is easy. The principal are :—(1) **Durham and Northumberland** ; (2) **South-west Yorkshire**, with a strip extending into **Derbyshire and Nottinghamshire** ; (3) **South Lancashire** ; (4) **South Wales**, extending from the **Towy** to the **Usk** ; (5) **North and South Staffordshire** ; (6) **North Wales (Flint and Denbigh)** ; (7) **Cumberland** ; (8) **Somerset and Gloucester** ; (9) **Leicestershire and Warwickshire** ; (10) **Shropshire.**

2. **Iron** is found and worked on or near most of the coal-fields. The chief districts are **Cleveland**, near the **Durham coal-field** ; **South Cumberland and Furness**, near the **Cumberland coal-field** ; **South Wales, Staffordshire, Forest of Dean, Northamptonshire, Leicestershire, Lincolnshire, South Yorkshire, and Derbyshire.**

3. Important **building-stones** are quarried at **Portland, Bath, Ketton** in **Rutland, Ancaster**, in **Lincolnshire**, and in most of the hilly districts to the west of the **Oolitic Escarpment** ; **marble** is obtained from **Derbyshire, Devonshire, and Anglesey** ; **granite** from **Cornwall, Devon, Cumberland, and Charnwood Forest.**

4. **Slate** is found chiefly in **North Wales, Cornwall, Devon, Cumberland, and Westmorland.** The largest quarries are at **Penrhyn, Festiniog, and Llanberis.**

5. **Tin-ore** is obtained chiefly from **Cornwall and Devon.**

6. **Salt** is obtained in **Cheshire, Worcestershire, and Durham.**

7. **Fire-clay** is found on the coal-fields. **China-clay** in **Cornwall and Devon.**

8. **Lead-ore** is obtained in many districts, but chiefly from the **Isle of Man** and the west of **Durham.**

9. **Zinc-ore** is produced chiefly in **Denbigh, Cardigan, Cumberland, and the Isle of Man.**

10. **Copper-ore** is obtained to a very limited amount in **Cornwall and Devon.**

Though England is deficient in the precious metals, it is the most productive mining country in the world. The reasons for this great productiveness are :—

(1) The abundant supplies of coal, iron, limestone, and fire-clay, which are often found near each other upon the same coal-field.

(2) The coal-fields are distributed all over the country.

(3) The nearness of the coal-fields to natural harbours, upon which great seaports have sprung up.

(4) The geographical position of England, which gives it easy communication with all parts of the world.

(5) The indented nature of the coast line ; no place being far from the sea.

These natural advantages must also be remembered when studying British manufactures and commerce.

MANUFACTURES.—The use of steam machinery has made it cheaper and more advantageous to build factories, works, &c., in districts where cheap fuel can be obtained. Hence all the great manufacturing industries are almost entirely situated on the coal-fields, and these districts have become the most densely populated parts of the country. The leading industries are the manufacture of **textiles** and **metals**. The three principal manufactures in order of importance are :—

(1) **Cotton goods** ; (2) **iron goods** ; (3) **woollen goods**. Of lesser importance, the manufacture of **silk goods**, **linen**, **earthenware**, **glass**, **chemicals**, **leather**, **paper** ; together with the **smelting of copper** and other metals, and the **making of brass**, **bronze**, &c.

1. THE COTTON MANUFACTURE.—This is the most valuable of England's manufactures, and is carried on almost entirely upon the **coal-field of South-east Lancashire**.

The chief reasons for the manufacture being confined to this part of the country are :—

1. It is a region of cheap coal and iron.

2. The climate is moist, which is essential both for the spinning and weaving of cotton. Cold and dry weather adds considerably to the cost of production.

3. By means of the seaport of Liverpool, ready access is obtained to the United States, where much of the cotton is grown.

Raw cotton is obtained chiefly from the United States, India, and Egypt, the total value of the import in 1913 being about 70,000,000*l.* The value of the cotton goods exported during the same year was over 125,000,000*l.*, and it must be remembered that vast quantities are kept for home consumption.

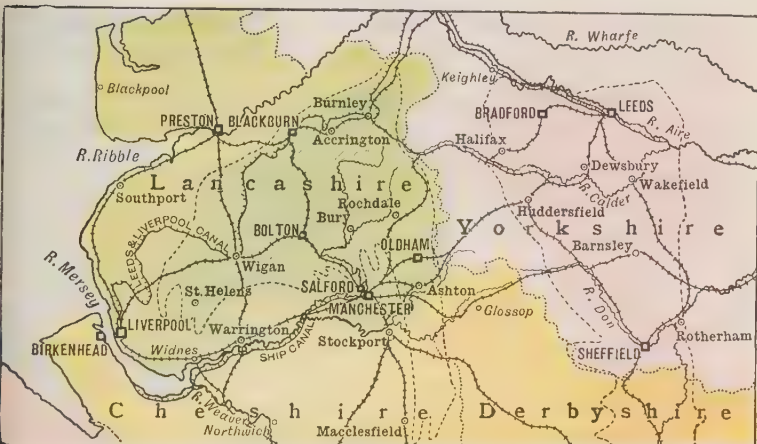
Manufacturing Towns.—The chief towns engaged in this manufacture are **Manchester** (730) and **Salford** (234), the centre

of the trade ; **Oldham** (145), **Bolton** (178), **Bury**, **Rochdale**, **Stockport**, **Ashton**, **Blackburn** (126), **Preston** (117), **Accrington**, **Burnley**, and **Glossop**.

At a distance from Manchester, the only town largely engaged in the making of cotton goods is **Nottingham**, which manufactures cotton hosiery, machine-made net and lace.

Manchester (and **Salford**) is the greatest manufacturing town in the world, and one of the largest cities in England. Since the great improvements and inventions of the last century in the machinery for spinning

FIG. 106.—LANCASHIRE AND YORKSHIRE COAL-FIELDS.



NOTE.—The Coal-fields are marked by diagonal lines.

and weaving, the town has grown with the great increase in the cotton trade. In 1801 its population was only 84,000; it is now 964,000, and the population within twelve miles radius of Manchester Exchange is over 2 millions. It is also engaged in many other manufactures, the chief being **machinery**. A ship canal has been constructed to Manchester from the Mersey, a few miles above Liverpool, so that goods may be brought by ship direct, without unloading at Liverpool.

Cotton Seaport.—**Liverpool** (803,000) was founded in the twelfth century, but it was not till the opening of the South-east Lancashire coal-field and the development of the cotton industry that it rose to prominence. Now it is one of the chief seaports. Its docks, constructed of granite, extend for seven miles along the banks of the Mersey, and can accommodate the largest ships afloat. Its chief imports are **raw cotton**, **wheat** and **other food-stuffs**, **sugar**, and **timber**, and it exports manufactured goods to all parts of the world. It possesses several fine parks and many noble buildings, the finest of which is **St. George's Hall**. A floating landing-stage, half a mile in length, lies near the shore, with which it is connected by several bridges, one of which forms a broad roadway that rises and falls with the tide. On the opposite side of the river is **Birkenhead**, which in about

eighty years has grown from a small village to be a town of over 145,000 inhabitants. The two towns are connected by a tunnel under the river, and together have a population of over 900,000. Most of the great railway companies run into Liverpool, and a line of electric railway skirts the whole length of the docks.

Other industries are also carried on in **South-east Lancashire**. The older industry, that is, the **woollen manufacture**, is still carried on in some of the towns; thus Rochdale has **flannel mills**, and Bury, Ashton, Glossop, and Bolton all make **woollens** of some kind; Warrington manufactures **iron wire**; Oldham and Bolton make **machinery** for cotton-spinning and weaving; **steam engines and machinery** are made at Manchester; **glass** is made at St. Helens; many industries are carried on at Liverpool; and immense **alkali works** are situated at Widnes; **coal-mining** is also a very important occupation, the centre being at **Wigan**, and it is largely due to the abundance of cheap coal that the great manufacturing industries of Lancashire have been able to grow up.

2. THE IRON MANUFACTURE.—The smelting of iron, the manufacture of steel, and the making of iron and steel goods such as engines and machinery of all kinds, hardware, and cutlery, make up one of the largest industries of this country. In 1921 the value of the iron and steel goods and machinery exported exceeded 63,000,000%.

The chief reasons for the enormous development of this industry are:

1. The abundance of iron-ore, coal, and limestone in the same districts.
2. The inventions of modern machinery.
3. The development of railways all over the world.
4. The opening up and colonisation of British Colonies, and the expansion of trade to India. These countries import most of their iron and steel goods from England.

Iron smelting is carried on chiefly upon the coal-fields. The chief centres of the industry are:

1. In the **North Riding of Yorkshire** and the **south of Durham**. **Middlesbrough** is the centre of the trade.
2. On the **South-west Yorkshire coal-field**, at many places, extending from the neighbourhood of Derby to Leeds.
3. On the **South Wales coal-field** at **Merthyr Tydfil**, **Newport**, and other places.
4. On the **Staffordshire coal-field**.
5. In **North Lancashire**, and on the **Cumberland coal-field** at **Barrow** and **Workington**.

The towns of **Barrow** and **Middlesbrough** have risen into prominence during the last fifty years, owing to the working of iron in their vicinity. **Middlesbrough** has an abundance of good iron-ore in its neighbourhood, plenty of limestone, and obtains its coal from Durham. Further, the estuary of the **Tees** has been dredged so as to admit large vessels.

The ores for the iron industry of South Wales are obtained mostly from Spain, and the ports of **Cardiff**, **Newport**, and **Swansea** receive more than a third of the iron-ore imported into the United Kingdom.

The manufacture of iron and steel goods is carried on chiefly in two districts:—

1. The **Black Country**, lying in **South Staffordshire** and parts of **Worcestershire** and **Warwickshire**, the centre of which is **Birmingham**.

2. **South Yorkshire**, the centre of which is **Sheffield**.

Birmingham (919) has been the centre of a great iron industry for several hundreds of years, due, no doubt, to the abundance of iron-ore, and the great forests which supplied the charcoal which was formerly used for smelting. At the present day, not only is **Birmingham** one of the largest towns in the country, but a group of towns such as **Wolverhampton** (95), **Dudley**, **Walsall**, **Wednesbury**, and **West Bromwich**, have sprung up near it, all of which are engaged in making goods from iron or steel. Near by in **Worcestershire** are the towns of **Bromsgrove**, **Stourbridge**, and **Redditch** (the chief town for the needle manufacture), also engaged in the making of iron and steel goods.

Sheffield (490) is specially renowned for the making of cutlery. The reason why the town is engaged in this special branch of the iron trade is the abundance of excellent stone for grinding purposes found in its immediate neighbourhood, good water power, and the stores of coal and iron found close by. **Sheffield** imports some of its best ores from **Sweden**. **Armour plates** and **steel rails**, &c., are also important branches of manufacture. **Rotherham**, a few miles lower down the **Don**, is also chiefly engaged in the iron manufacture.

Steam engines and **railway carriages** are made at **Manchester**, **Birmingham**, **Newcastle**, and **Darlington**. Several of the great railway companies have established works to supply their own needs. Thus, the **London and North-Western** make their engines at **Crewe**, the **Great Western** at **Swindon**, the **Great Northern** at **Doncaster**, and the **Midland** at **Derby**.

Machinery for cotton-spinning and weaving is made at **Bolton** and **Oldham**; for the worsted industry largely at **Keighley**; for elastic webbing at **Leicester**.

Agricultural implements are made at **Grantham**, **Gainsborough**, **Lincoln**, **Ipswich**, and at many other agricultural centres.

The building of **ships of steel** is carried on at the mouths of the **Tyne**, **Wear**, and **Tees**; at **Hull**, **Birkenhead**, **Barrow**, and on the **Thames**; while warships are constructed in the Government dockyards at **Chatham**, **Devonport**, **Portsmouth**, and **Pembroke**, as well as in private dockyards.

Arms are made at **Birmingham** (small arms), **Newcastle** (cannon, &c.), **Sheffield**, and at the Government factory at **Woolwich**.

Rails are made at **Middlesbrough** and **Barrow**.

Tin and **zinc plate** is manufactured at **Swansea**, **Llanelly**, and other towns on the **South Wales coal-field**.

3. THE WOOLLEN MANUFACTURE.—In early days this industry was carried on in those districts which produced quantities of raw wool, and which contained plenty of streams to supply water-power.

The **West Riding of Yorkshire** has long been the chief seat of the industry, which since the introduction of modern machinery has increased with great rapidity, and many towns have sprung into existence.

The special reasons for this are:—

1. The abundance of coal and iron found in the county.
2. The plentiful water supply.
3. The existence of two great seaports, Hull and Liverpool, within easy reach.

The raw wool is obtained chiefly from Australia and South Africa. The total value of the wool imported is about 58,000,000*l.*, while the value of the woollen goods exported is over 45,000,000*l.*, in addition to the large amount retained for home consumption.

Manufacturing Towns.—The principal centre of the trade is **Leeds** (458), which is, to the woollen industry, much the same that Manchester is to the cotton industry. Besides being the centre of the **wholesale clothing** trade of the country, it has also a large trade in **leather**, and is rapidly becoming an important centre of the **iron and steel** manufactures. **Bradford** (285) is the great centre of all branches of the **worsted** manufacture, and also possesses **silk, velvet, and plush** mills. **Halifax** (199) is noted for its **carpets**, and **Huddersfield** (110) for its fancy and plain fabrics. **Dewsbury** and **Batley** manufacture heavier materials, including blankets and shoddy. Other towns engaged in this industry are **Wakefield, Barnsley, Keighley, Morley, Heckmondwike**, and the towns of **Rochdale, Bury, Ashton, and Glossop**, on the Lancashire coal-field.

The **West of England** district was early noted for its woollen industries, and still produces the finest broadcloth. The principal towns engaged in the manufacture are **Stroud** in Gloucestershire, and **Bradford and Trowbridge** in Wiltshire.

Carpets are also made at **Wilton** in Wiltshire, and at **Kidderminster** in Worcestershire.

Other Towns.—**Kendal**, in Westmorland, still manufactures woollen goods, for which it was famous hundreds of years ago.

Norwich (121) is the only town in the eastern counties which still makes woollen goods, although formerly there were several towns engaged in this industry.

Leicester (234) is the chief centre of the woollen hosiery manufacture. This is due to its being near a coal-field, and to the excellent wool of the Leicestershire sheep.

Newtown and Welshpool, in Montgomeryshire, manufacture flannel.

OTHER MANUFACTURES.—(1) The silk industry is chiefly carried on in **Derbyshire** and in the adjacent parts of **Cheshire** and **Staffordshire**, where there is an abundant supply of suitable water.

The chief towns engaged in this manufacture are:—

Derby (129), **Ilkeston**, and **Chesterfield**, in **Derbyshire**.

Macclesfield and **Congleton**, in **Cheshire**.

Leek (dyeing and silk thread), in **North Staffordshire**.

In addition to these, **Coventry**, in **Warwickshire**, makes ribbons; and **Bradford**, silk velvets and plushes. There are silk factories also at **Spitalfields** in **London**, **Norwich**, and other places.

(2) The linen industry is only carried on to a limited extent in **England**; **Barnsley**, in **Yorkshire**, being the only town.

(3) The making of earthenware and porcelain grew up in **North Staffordshire**, there being plenty of coal and suitable clays at hand. The district known as the **Potteries** is still the chief centre of the manufacture, although the clay (kaolin) is now brought mostly from **Cornwall** and **Devon**.

The chief towns in **Staffordshire** are: **Burslem**, **Stoke**, **Hanley**, **Newcastle-under-Lyme**, and **Etruria**.

Worcester and **Derby** are noted for fine porcelain; **Lambeth** and **Stourbridge** for stoneware.

(4) **Glass** is also made in districts where fuel and salt (necessary for making the alkali used) are plentiful.

The chief towns engaged in the manufacture are: **St. Helens** (102), near the **Cheshire** salt district; **Birmingham**, **Dudley**, and **Stourbridge**, near the **Worcestershire** salt district; and **South Shields**, near the **Durham** salt district.

(5) **Salt** is produced at **Northwich**, **Middlewich**, **Winsford**, and **Sandbach**, in **Cheshire**, and at **Droitwich** in **Worcestershire**.

(6) **Chemicals**, which include a great variety of commodities, such as alkali, sulphuric acid, potash, ammonia, &c., are made at many places. Alkali, the chief, is made at **Widnes**, **St. Helens**, and **Flint**, near the **Cheshire** salt district, and at **South Shields**, **Newcastle**, **Swansea**, and other places.

(7) The leather industry is chiefly carried on at **Leeds**, **Bermondsey**, **Northampton**, **Leicester**, and **Stafford**. **Gloves** are made at **Worcester**, **Hereford**, **Woodstock**, and many smaller towns in agricultural districts.

(8) The manufacture of paper is carried on in districts where there is a good supply of pure water. The chief districts are **Kent**, **Derbyshire**, **Mid-Lancashire**, and **Berkshire**.

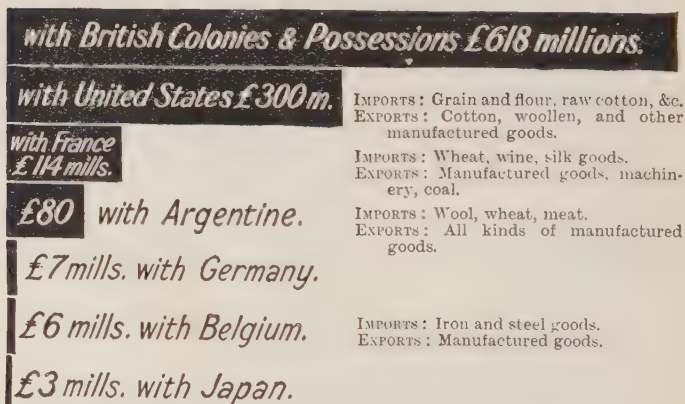
(9) The smelting of copper, silver, lead, zinc, and sulphur-ores is carried on chiefly on the **South Wales** coal-field.

(10) The making of articles from brass, bronze, &c., is largely carried on at **Birmingham** and **Rotherham**.

(11) **Electro-plating** is chiefly carried on at **Birmingham** and **Sheffield**; **straw plaiting**, in the neighbourhood of **Luton**, in **Bedfordshire**; **sugar refining** at **London**, **Liverpool**, and **Bristol**; **hand-made lace** at **Honiton**, in **Devonshire**, and around **Bedford**; **beer**, at **Burton-on-Trent**.

COMMERCE.—The foreign commerce of the British Isles is much greater in value than that of any other country in the world. The total value of British exports and imports for the year 1923 amounted to over 1,865,000,000*l.* Of this foreign trade 80 per cent. belongs to England. The diagram shows the value in pounds sterling of British exports and imports with the seven chief countries that carry on a large foreign trade :

FIG. 107.—BRITISH TRADE WITH OTHER COUNTRIES, 1923.



A comparison of the shipping of the chief countries of the world shows even more clearly how large a proportion of the carrying trade of the world is done in British ships.

The net tonnage of the shipping belonging to the six principal maritime countries of the world is given as follows (Lloyd's Register, 1922) :

	Tonnage		Tonnage
British . . .	19,000,000	Norway . . .	2,300,000
United States . .	12,500,000	France . . .	3,300,000
Germany . . .	1,700,000	Italy . . .	2,600,000

If the total tonnage of the shipping of all countries owning 200,000 tons or more be taken, it will be found that more than 30 per cent. is British.

Causes of British Trade.—The chief causes that have contributed to make the United Kingdom the greatest trading country in the world are :—

1. Advantages that have led to a great production of articles of commerce, such as a favourable climate and the abundance of raw material, such as coal and iron.

2. Advantages that have combined to help in the distribution of articles of commerce, such as the geographical position, nearness of the coast on both sides, abundance of natural harbours, and large number of navigable rivers.

3. Advantages that are largely the outcome of 1 and 2, but which also help to increase trade, such as the abundance of capital, the magnitude of British shipping, the great number and extent of the colonies, the free trade policy of the last fifty years, and the skill of the British workman.

The imports of the United Kingdom consist chiefly of articles of food and raw material for manufactures. The chief articles of import, their value in 1921, with the chief places they are obtained from, are as follows :

Grain and flour (principally wheat), 122,000,000*l.*, from the United States, Russia, Argentina, India, Australasia, and British North America.

Raw Cotton, 73,000,000*l.*, from the United States, India, and Egypt.

Wool, 41,000,000*l.*, from Australasia, South Africa, and British India.

Meat, 125,000,000*l.*, from North America, Australasia, and the Argentine.

Sugar, 35,000,000*l.*, from Germany, Java, British Guiana, and British West Indies.

Butter, &c., 42,000,000*l.*, from Holland, France, Australasia, and Denmark.

Wood and Timber, 30,000,000*l.*, from British North America, Russia, Sweden, Norway, and Burma.

Raw silk and silk manufactures, 1,768,000*l.*, from China and France.

Tea, 23,000,000*l.*, from India, Ceylon, and China.

Woolen manufactures, 1,125,000*l.*, from France, Holland, and Germany.

Flax, from Russia, Belgium, and Holland.

Hemp, from Russia, Italy, and India.

Jute, from India.

Leather and hides, from India, the United States, France, Australasia, South Africa, and South America.

Wine, from France, Australia, Portugal, and Spain.

Coffee, from Central America, India, Ceylon, and Brazil.

Tobacco, from the United States, France, and Holland.

Eggs, from France and Belgium.

Cheese, from British North America, Holland, and France.

Oils, from West Africa, Italy, Holland, Ceylon, the United States, India, and Russia.

Chemicals and dye-stuffs, from Chile and Turkey.

Seeds, from Egypt.

Fruits, from Australia, Tasmania, Canada, West Indies, Spain, Portugal, Italy, Greece, Turkey, and America.

Metals, from Spain, Portugal, South Africa, the Straits Settlements, Chile, Norway, and Sweden.

Rubber, from Africa, Brazil, and the East Indies.

About one-fourth of the value of the imports is obtained from the United States, the chief articles being raw cotton, grain, bacon and hams, meat, fruit, and tobacco. The British Possessions and India supply about another fourth. The raw materials for our chief textile industries—cotton, wool, flax, hemp, silk, jute, &c.—make up together about one-sixth the value of the total import.

FIG. 108.—UNITED KINGDOM: CHIEF ARTICLES OF IMPORT, 1922.

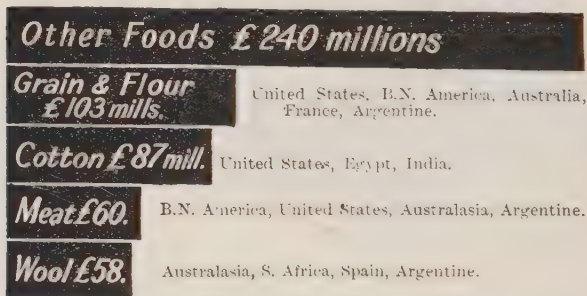
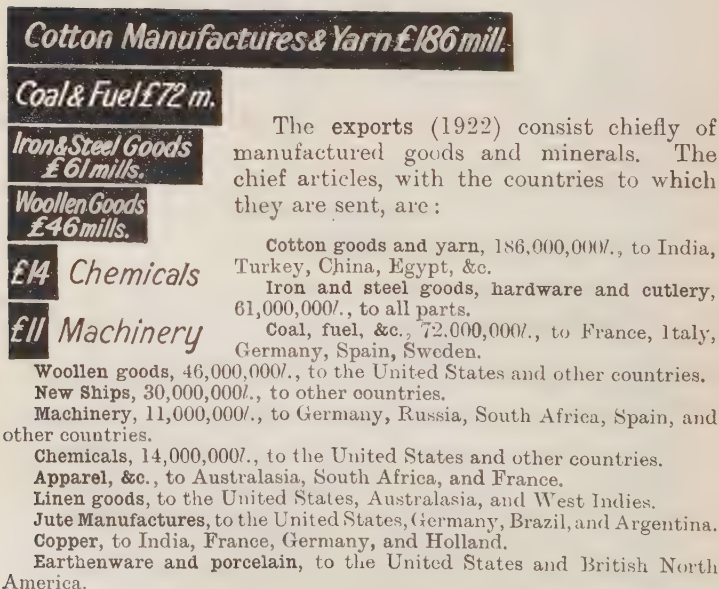


FIG. 109.—UNITED KINGDOM: CHIEF ARTICLES OF EXPORT, 1922.



Of the total exports, the British Colonies and Possessions take over

a third. Next according to the value taken come the United States, France, the Argentine, Germany, Egypt, Belgium, and Japan.

The three most noticeable facts with regard to British trade in recent years are: (1) the increase in the value of the export of cotton and woollen goods in spite of foreign competition and that many of our best customers (*e.g.* India and cotton goods) are now making fabrics for themselves, and are even competing with us in other markets; (2) the great rise in the value of the export of machinery, and also of coal and fuel; (3) the large proportion of British trade with India and the Colonies.

SEAPORTS.—The chief seaports of England, according to the tonnage cleared in 1922, are:—**London, Liverpool, Cardiff, the Tyne Ports, Southampton, Hull, Plymouth, Newport, Swansea, Middlesbrough, Blyth, Dover, Sunderland, Grimsby, Manchester, Bristol.**

London (4,483) still holds by far the first place among English seaports. It includes the whole of the Thames from London Bridge to Tilbury and Gravesend. The total tonnage of shipping entered and cleared for foreign trade in 1912 was about 24 million tons; and, in addition, it must be remembered that London has the largest coasting trade of any place in the world. Trade is carried on with all parts of the world, the most important, however, being the Australian and East Indian traffic. Over one-third of the imports are received at, and nearly one-third of the exports are sent from, this great port. There are numerous docks, those at Tilbury having a depth of 38 feet.

Liverpool 803), with **Birkenhead** (145), which is included with it as a port, have a joint population of about 950,000. It has risen to a first place among the seaports of the world during the last 200 years. This rapid growth is chiefly due to the development of the great industries of the Lancashire and Yorkshire coal-fields, and to the great increase of population in America. Its docks are the finest in the world, and afford a water-space of nearly a square mile, with upwards of 40 miles of quays. Liverpool despatches over one-third of the exports and receives about a quarter of the imports of the country. The total tonnage for foreign trade entered and cleared in 1912 was nearly 22 million tons. The average size of ships using the port of Liverpool is larger than that of the ships using the port of London.

Cardiff (200) rivals Liverpool in its total tonnage. Its rapid rise during the last few years is one of the most striking facts in the history of the growth of trade in recent times. In 1871 its population was only about 40,000. It is the outlet of the great South Wales coal-field, which sends great quantities of coal all over the world. The total tonnage entered and cleared in 1912 for foreign trade was over 16 million tons.

Newcastle (274) is still the chief port for the export of coal for ordinary purposes, although outstripped by Cardiff in the foreign trade. It has also a large coasting trade.

North (21) and **South Shields** (116), situated respectively on the north and south banks of the Tyne, form one port. The whole district from Newcastle to the sea has a great trade in coal, iron, machinery, cannon, shipbuilding, glass, and chemicals.

Hull (287) is one of the older ports of England, and has long traded with the Baltic and Continental ports. It is the chief port for the great agri-

cultural and mining districts which form the basin of the Ouse and Trent. Since the great extension of railways, Hull has had to face the competition of **Grimsby**, a rapidly growing rival on the opposite coast of Lincolnshire. Most of the fish trade of this part of the country now goes by way of Grimsby.

Southampton (161) is the most important commercial port on the south coast. It has a large trade with America, South Africa, and many other countries.

Sunderland (159) has a large export trade of coal and a considerable shipbuilding trade.

Newport (92), on the Usk, exports the products of the South Wales coal-fields.

Middlesbrough (131) has a great trade in heavy iron goods, and has grown with great rapidity since the development of the Cleveland iron industry. In 1840 it was only a village.

Swansea (157) has a large export trade in coal, and is the great seat of the copper-smelting industry, great quantities being imported as ore and exported as metallic copper.

Bristol (377) was at one time the most important seaport in the west of the United Kingdom, but it has long been outstripped by such ports as Liverpool, Glasgow, and Cardiff. It was one of the first seaports to share in the trade in sugar and tobacco which sprang up after colonies were planted in the New World. Its import trade is still large, but its export trade is very small, for it is not near any great manufacturing or mining centre.

Hartlepool (64), situated just to the north of the estuary of the Tees, has a trade in coal, iron, and sail-cloth.

INTERNAL COMMUNICATION.—The means of internal communication in England are better than in any other country in the world. By means of **railways, canals, rivers, and splendid roads**, goods are easily moved from one part of the country to another, and the completeness and efficiency of the internal communication are seen in the fact that the prices of articles in most common use vary but little in different parts of the country.

1. **Canals.**—England has about 2,400 miles of canals open for traffic. These were mostly constructed in the latter part of the eighteenth century and the early part of the nineteenth. Since railways have been made the importance of canals has greatly diminished. Among the chief canals are :

The **Leeds and Liverpool**, connecting the Ouse and the Mersey.

The **Birmingham and Liverpool**, connecting the Mersey with the Midlands.

The **Birmingham and Worcester**, connecting the Severn with the Midlands.

The **Kennet and Avon**, connecting the Thames with Bristol.

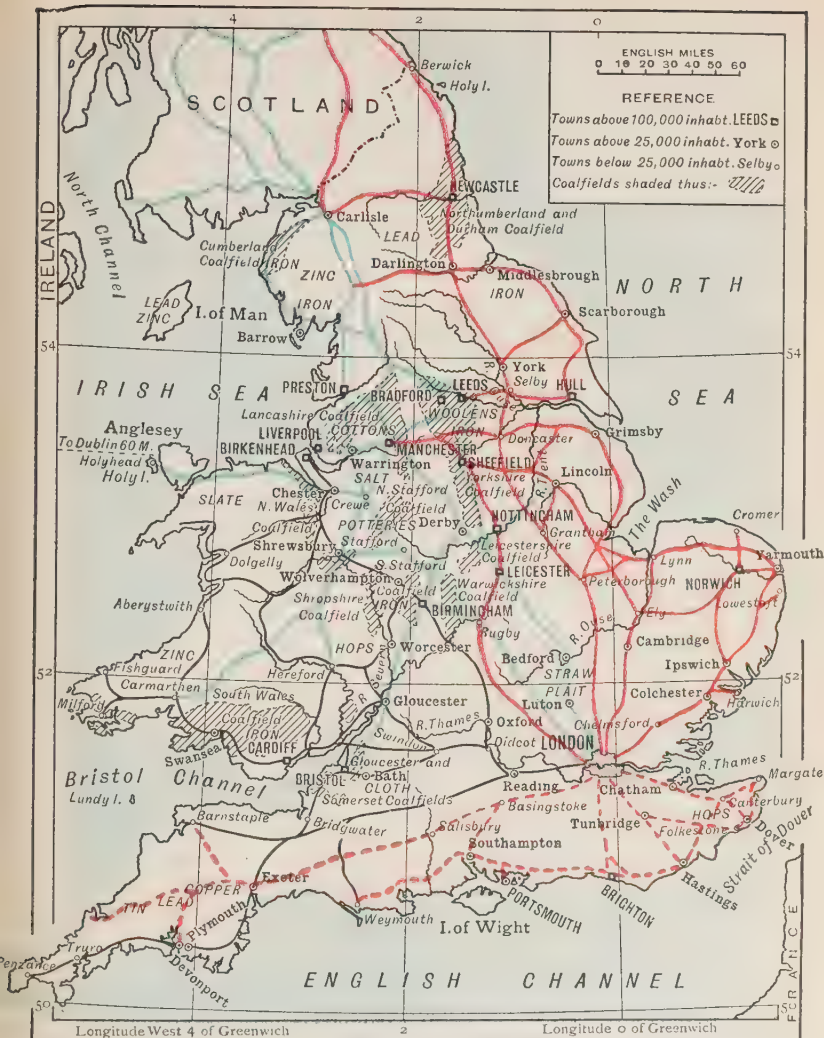
The **Grand Junction**, from London to the Midlands, connecting the Thames and the Trent.

The **Aire and Calder**, from Goole to the manufacturing towns of the West Riding.

The **Manchester Ship Canal**, 35 miles long, from Eastham, on the Cheshire side of the Mersey, by Runcorn and Warrington, to Manchester.

The **Gloucester and Berkeley Ship Canal**, to avoid the windings and shallows of the Severn.

FIG. 110.—RAILWAYS AND COAL-FIELDS.



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Great Western Railway

Southern Railway

London, Midland & Scottish Railway

London & North Eastern Railway

2. Railways.—**London, Midland, and Scottish Railway**, embracing the former Midland, London and North-Western, Caledonian, Glasgow and South-Western, and Highland Railway.

This system, roughly speaking, covers the western and midland side of the country from London through to Glasgow. Its centre goes through the great manufacturing districts round Birmingham, the Potteries, and South-East Lancashire. It also is connected with the services from Ireland *viâ* Holyhead and Fleetwood. Some of the most important towns are Birmingham, Liverpool, Manchester, and Glasgow. It is joined up also with the Scottish railways.

London and North-Eastern Railway, embracing the former Great Northern, Great Eastern, North British, North-Eastern, Great Central, Great North of Scotland, Hull and Barnsley.

This great system covers the country on the eastern side of England, and penetrates into Scotland as far as Edinburgh. In the southern section it passes mainly through an agricultural country, and further north, particularly in Yorkshire, it taps the great woollen, iron, and steel manufacturing districts. It is connected with the Continent *viâ* Harwich, Grimsby, Hull, the Tyne ports, and Leith. Towns in this system are Cambridge, Norwich, Leicester, Nottingham, Sheffield, Hull, Newcastle, and Edinburgh.

Great Western Railway, embracing the former Great Western and the numerous railways in South Wales.

This system, embracing as it does the old Great Western, joins London with the whole of South Wales, and also with Birkenhead. From London to Newport the railway runs mainly through an agricultural district. It then taps the great colliery district of South Wales. The most important seaports of the system are Bristol, Cardiff, Swansea, and Newport. Bristol has a large trade with America; but the south Welsh ports are mainly engaged in the shipment of coal and ores. This system is connected with Ireland by steam boats that run from Fishguard to Rosslare.

Southern Railway, embracing the former London and South-Western, the South-Eastern and Chatham, and the London, Brighton, and South Coast.

This system connects London with the whole of the South Coast. The country through which it passes is mainly agricultural; but it is also connected with the great shipping port of Southampton, as well as the naval ports and dockyards at Portsmouth and Devonport. It is connected with the Continent by regular sailings from Dover, Folkestone, and Southampton. It is also connected with many favourite watering-places, such as Brighton, Hastings, Eastbourne, Margate, and many others.

The general relief of the country is most favourable for the construction of railways. There are no high mountains to be pierced or crossed, no very large rivers to be bridged, and such is the shape of the country that no town is far from a seaport. All the railways of England are in the hands of private companies. The roads are well made, and intersect the country in all directions, the rolling stock is of the best, and the service is quick. In 1920 there were 20,292 miles of railroads open for traffic in Great Britain.

The preceding page shows the chief railways, their length, the nature of the country traversed, the character of the traffic, and the principal towns on the system.

POLITICAL DIVISIONS.—England is divided into forty, and Wales into twelve shires or counties. The word **shire** is of Saxon derivation, and means a share. It indicates a separate district having its own local officers. The Normans introduced the term **county**, which means the domain of a count. Yorkshire, being so large a county, was divided into three **ridings** or trithings. The counties were again subdivided into **hundreds**, and these again into **parishes**.

In Yorkshire and part of Lincolnshire the subdivisions were called **wapentakes** (a district in which the men formed one body for defence). In Kent, a division between the hundred and the shire is called a **lathe**. In Sussex, a similar division is termed a **rape**.

At the present time the divisions under the various local councils (County Councils, &c.) are more important.

The counties, with their county towns, are as follows :

1. Six Northern

Northumberland	Newcastle, on the Tyne.
Durham	Durham, on the Wear.
Yorkshire	York, on the Ouse.
Cumberland	Carlisle, on the Eden.
Westmorland	Appleby, on the Eden.
Lancashire	Lancaster, on the Lune.

2. Five Eastern

Lincolnshire	Lincoln, on the Witham.
Cambridgeshire	Cambridge, on the Cam.
Norfolk	Norwich, on the Wensum.
Suffolk	Ipswich, on the Orwell.
Essex	Chelmsford, on the Chelmer.

3. Six North Midland

Cheshire	Chester, on the Dee.
Derbyshire	Derby, on the Derwent.
Nottinghamshire	Nottingham, on the Trent.
Staffordshire	Stafford, on the Sow.
Leicestershire	Leicester, on the Soar.
Rutlandshire	Oakham.

4. Six West Midland

Shropshire	Shrewsbury, on the Severn.
Herefordshire	Hereford, on the Wye.
Worcestershire	Worcester, on the Severn.
Warwickshire	Warwick, on the Avon.
Gloucestershire	Gloucester, on the Severn.
Monmouthshire	Monmouth, on the Wye.

5. Seven South Midland

Northamptonshire	Northampton, on the Nen.
Huntingdonshire	Huntingdon, on the Ouse.
Bedfordshire	Bedford, on the Ouse.
Hertfordshire	Hertford, on the Lea.
Middlesex	Brentford, on the Thames.
Buckinghamshire	Aylesbury.
Oxfordshire	Oxford, on the Thames.

6. Five South-Eastern

Kent	Maidstone, on the Medway.
Sussex	Lewes, on the Ouse.
Surrey	Guildford, on the Wey.
Berkshire	Reading, on the Kennet.
Hampshire	Winchester, on the Itchen.

7. Five South-Western

Wiltshire	Salisbury, on the Avon.
Dorsetshire	Dorchester, on the Frome.
Somersetshire	Taunton, on the Tone.
Devonshire	Exeter, on the Exe.
Cornwall	Bodmin.

8. Six in South Wales

Glamorganshire	Cardiff, on the Taff.
Carmarthenshire	Carmarthen, on the Towy.
Pembrokeshire	Haverfordwest, on the Cleddau.
Cardiganshire	Cardigan, on the Teifi.
Brecknockshire	Brecon, on the Usk.
Radnorshire	New Radnor.

9. Six in North Wales

Montgomeryshire	Montgomery.
Merionethshire	Dolgelly, on the Mawdach.
Carnarvonshire	Carnarvon, on the Menai Strait.
Anglesey	Beaumaris, on the Menai Strait.
Denbighshire	Denbigh.
Flintshire	Flint, on the Dee.

Derivation of County Names.—The English shires were formed at different times, and their names are derived from various sources. Some represent the **ancient Saxon kingdoms** (in cases where the kingdom was a large one, as in the case of Mercia, Wessex, &c., it was divided into several shires); others indicate the **settlements of different families or tribes**; others, again, are named from characteristic **physical features**; while the largest number are named from the **chief town or fortress** in the district.

REFERENCE.

Towns above 100,000 inhabt. BRISTOL

Towns above 25,000 inhabt. Derby

Towns below 25,000 inhabt. Oakham

County towns are underlined.

TOWNS.—No other country in the world contains so many large towns. In 1921 there were ninety-five towns, including the metropolitan boroughs, with a population exceeding 50,000. Of these towns, twelve exceeded 250,000 each — viz. London

FIG. 112.—THE SIX NORTHERN COUNTIES.



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Walker & Bouall sc

(4,500), including suburbs, over seven millions, Liverpool (803), Manchester (730), Birmingham (919), Leeds (448), Sheffield (490), West Ham (300), Bristol (377), Bradford (285), Hull (287), Newcastle-on-Tyne (275), and Nottingham (262). Thirty-one others

have populations between 100,000 and 250,000, the chief being Salford (234), Leicester (234), Portsmouth (247), Bolton (180), Cardiff (182), Sunderland (151), Oldham (147), Croydon (169), Blackburn (133), Brighton (131), Preston (117), Birkenhead (131), Norwich (121), Derby (123), Gateshead (117), Plymouth (112).

1. THE SIX NORTHERN COUNTIES.—Here the chief occupations are manufacturing and mining on the coal-fields; agriculture in the other parts, chiefly grazing; the only important corn-growing district being the East Riding of Yorkshire.

The chief towns are:—**Newcastle** (275), **North Shields**, and **Tynemouth** in Northumberland; with **Gateshead** (124), **Jarrow**, and **South Shields** (116), in Durham. From Newcastle to the sea forms one great industrial centre; coal is exported, and the manufactures of iron, machinery, cannon, glass, chemicals, and shipbuilding are extensively carried on. The other towns of Northumberland are small. **Alnwick** has a fine castle; **Morpeth** has iron foundries; **Blyth** is a small seaport; **Berwick-on-Tweed** was formerly of considerable importance as a border fortress; and **Hexham** is an agricultural centre near the junction of the North and South Tyne.

On the Wear are **Sunderland** (159), a great coal-exporting and shipbuilding port; **Durham**, the county town, with its fine cathedral and ancient castle, now used as a university; and **Bishop Auckland**.

The lower course of the Tees is another important industrial centre, with **Middlesbrough** (131) in Yorkshire, and **Stockton** and **Darlington** in Durham; while to the north of the estuary is the important seaport of **Hartlepool** (68).

In Cumberland and Westmorland there are no large towns. The capital of Cumberland is **Carlisle**, on the Eden, now an important railway centre. Higher up the river is **Appleby**, the capital of Westmorland, a small unimportant town. On the coast are the three towns of **Whitehaven**, which exports coal, **Workington**, and **Maryport**, all connected with the coal and iron industries of the Cumberland coal-field. Other towns are **Kendal**, on the Kent, one of the oldest woollen towns in England; **Penrith**, a small market town in Cumberland, and **Keswick**, in the Lake District.

In Yorkshire the great centre of population is the coal-field of the West Riding. Here are the woollen manufacturing towns of **Leeds** (458), on the Aire, which also is an important centre of the iron and leather industries; **Bradford** (285), which also manufactures velvet and plush; **Huddersfield** (110), **Halifax** (199), **Dewsbury** and **Wakefield** on the Calder, **Batley**, **Keighley**, and **Saltaire**.

Further south on the Don are **Sheffield** (490), with its manufactures of cutlery, heavy iron goods, armour plates, and electro-plate; **Rotherham** (68), with its iron and brass industries, and **Doncaster**, an old Roman town, now a great railway centre. **Barnsley**, on the Dearn, the centre of the West Riding colliery district, is also engaged in the manufacture of linen.

Among the other towns, **York** (84), on the Ouse, the county town, was once the most important town in the North of England; it has a magnificent cathedral, and is still partly surrounded by its old walls. **Ripon**, with its cathedral, **Northallerton**, **Thirsk**, **Pontefract**, **Malton**, and **Beverley** are agricultural centres. **Harrogate** has important mineral springs. **Hull**, or **Kingston-on-Hull**, is the chief seaport and the main outlet for the trade of the district. **Goole**, at the junction of the Don and Ouse, is a considerable distance inland, and derives its importance from being the port for the Aire and Calder Canal.

The greatest centre of population in the north is South Lancashire. Here are the cotton towns of **Manchester** (730), on the Irwell, and now by means of its ship canal a seaport, **Salford** (234), **Oldham** (145), **Blackburn** (126), **Bolton** (178), **Preston** (117), **Burnley** (103), **Rochdale** (91), **Bury** (56), **Wigan** (89), **Ashton**, **Warrington** (76), **Chorley**, and **Accrington**; **Stockport** (123), and **Staleybridge** in Cheshire, and **Glossop** in Derbyshire also belong to the same section. **St. Helens** (102) is an important seat of the glass manufacture; while the great port of **Liverpool** (see Seaports), is the chief centre for the imports and exports of this populous district.

In the north of the county is the iron manufacturing district of **Furness**, containing **Barrow** (74), with its shipbuilding yards, **Dalton**, and **Ulverstone**. **Lancaster**, on the Lune, the county town, is now of little importance.

Watering-places.—On the east side are **Alnmouth** on the Aln, **Redcar** and **Saltburn** in Cleveland, **Whitby** on the Esk, **Scarborough**, the chief pleasure resort on this coast, **Filey**, and **Bridlington**. On the west side the chief resorts are **Morecambe**, **Blackpool**, the busiest watering-place on the west coast, and **Southport**.

2. THE FIVE EASTERN COUNTIES.—The chief occupations are agriculture, fishing, and to a small extent manufacturing.

Excluding **West Ham** (300), in Essex, which is really a suburb of London, **Norwich** (121), on the Wensum, is the only town with a population exceeding 100,000; it has still important manufactures of woollen and silk goods. **Lincoln**, on the Witham, has a fine cathedral, situated on the edge of the Oolitic Escarpment, and carries on important manufactures of engines and agricultural implements. **Ipswich** (79), on the Orwell, also manufactures agricultural implements and machinery, and has a small shipping trade.

The other inland towns are all agricultural centres of trade. In Lincolnshire are **Gainsborough**, on the Trent; **Grantham**, on the Witham, with very extensive engine and implement works; **Louth**; **Stamford** and **Spalding**, on the Welland. In Cambridgeshire are **Cambridge**, the seat of one of our great universities, **Ely**, with a fine cathedral, **Wisbech**, and **Newmarket**. In Suffolk is **Bury St. Edmunds**, which formerly possessed one of the finest abbeys in England. In Essex are **Colchester**, on the Colne, with oyster fisheries, **Chelmsford**, on the Chelmer, **Maldon**, **Southend**, and **Saffron Walden**.

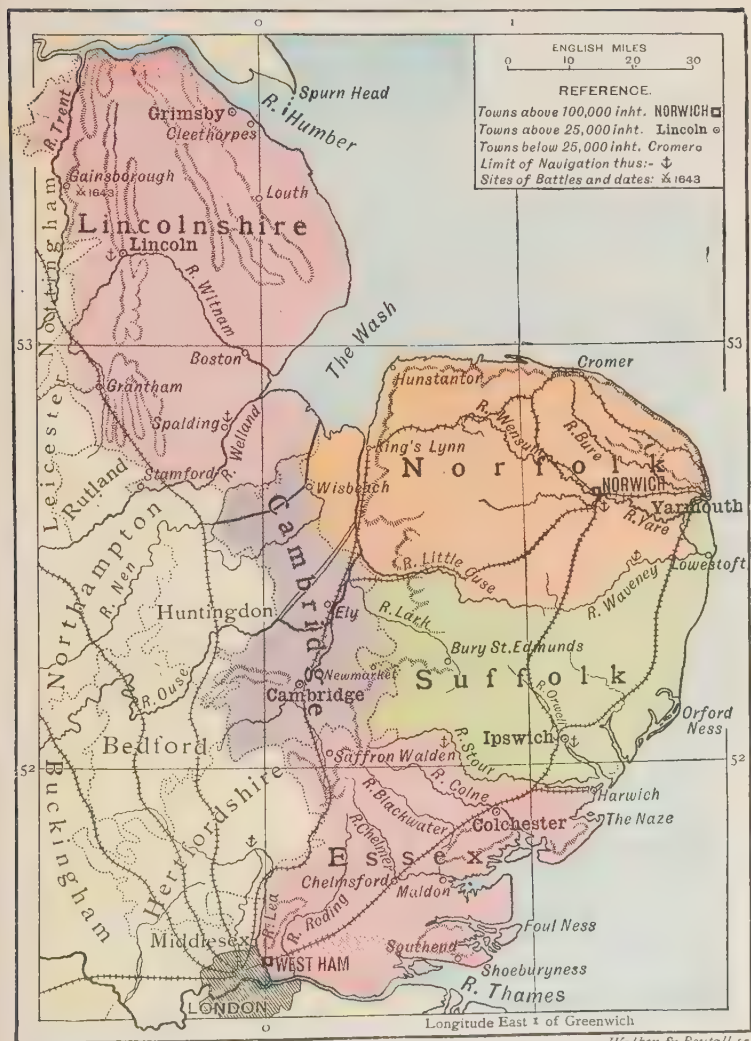
On the coast are **Grimsby** (82), an important fishing and commercial port, with considerable Continental trade; **Boston**, on the Witham; **King's Lynn**, on the Ouse; **Yarmouth**, on the Yare, and **Lowestoft**, both great fishing centres; and **Harwich**, at the mouth of the Stour, an important steam-packet station.

The chief watering-places are **Cleethorpes**, near Grimsby; **Hunstanton** and **Cromer**, on the north coast of Norfolk; **Yarmouth** and **Lowestoft**, at the extreme east, both busy resorts; and numerous smaller places.

3. THE SIX NORTH MIDLAND COUNTIES.—Here the occupations are manufacturing, mining, and agriculture.

In Cheshire the chief towns are on the coal-field. Here are the cotton towns of **Stockport** (123) and **Staleybridge**; the silk-manufacturing towns of **Macclesfield** and **Congleton**; and the salt-producing centres of **Nantwich**, **Northwich**, and **Middlewich** (*wich*=a brine spring, and is from the same source as *wick*, a creek). **Chester** is still surrounded with its walls, and retains very largely its ancient appearance. **Crewe** is a great railway junction, and the seat of the London and North-Western engine and carriage

FIG. 113. -THE FIVE EASTERN COUNTIES.

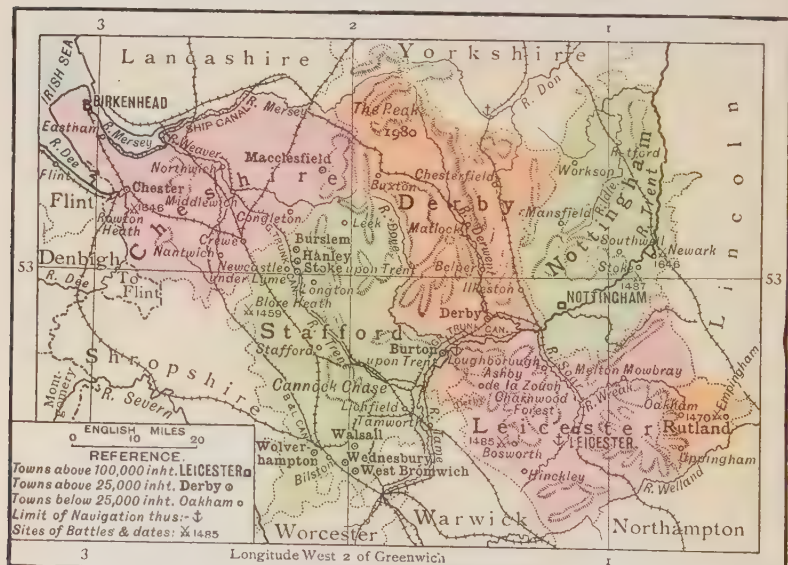


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works. The port of **Birkenhead** (145), on the opposite side of the Mersey to Liverpool, has grown very rapidly of late years.

In **Staffordshire** are two great centres of population: the 'Potteries,' in the north, consisting of **Hanley**, **Stoke**, **Burslem**, **Newcastle-under-Lyme**, and **Longton**; and the 'Black Country,' in the south, with the hardware towns of **Wolverhampton** (102), **Walsall** (96), **West Bromwich** (73), **Wednesbury** and **Bilston**. In the south-east is **Burton-on-Trent**, with its great breweries. **Leek**, in the north, is a silk-dyeing centre. **Stafford** has manufactures of boots and shoes. **Lichfield**, with its fine cathedral, and **Tamworth** are in agricultural districts.

FIG. 114.—THE SIX NORTH MIDLAND COUNTIES.

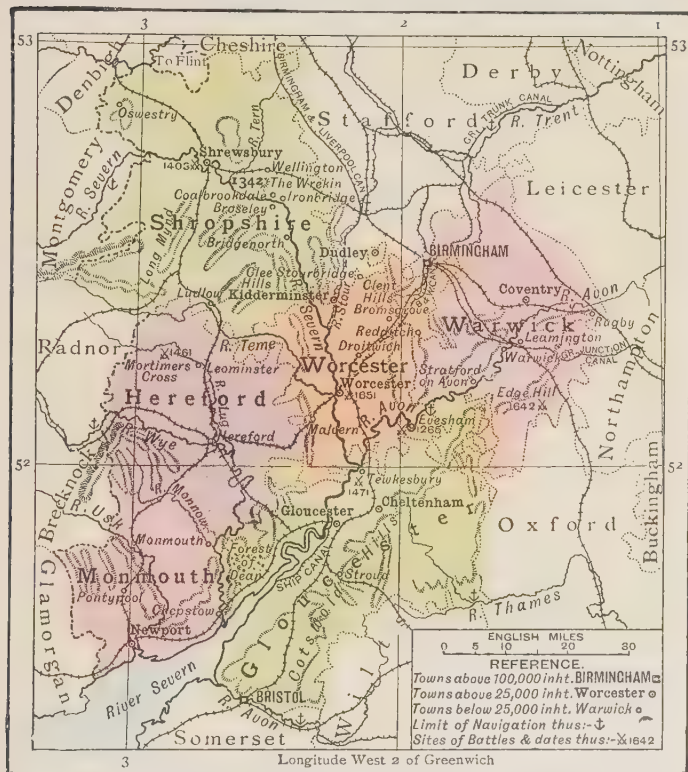


Derby (129), on the Derwent, has manufactures of silk, hosiery, china, and railway plant. **Nottingham** (262), on the Trent, is the chief town for the making of machine-made lace, and has also manufactures of silk, woollen, and cotton hosiery. **Leicester** (234), on the Soar, is the chief seat of the hosiery manufacture, and is also an important centre for the making of boots and shoes.

In **Derbyshire**, **Ilkeston** manufactures hosiery, silk, and needles; **Chesterfield** is becoming an important railway centre, and manufactures hosiery; **Belper** has cotton mills; while **Buxton** and **Matlock** are inland watering-places situated in the midst of lovely scenery. In **Nottinghamshire**, the towns of **Retford**, **Newark**, **Worksop**, and **Mansfield** are centres of agricultural trade; the latter also manufactures hosiery. In **Leicestershire**, the towns of **Loughborough** and **Hinckley** are engaged in the hosiery manufacture; **Melton Mowbray** is the centre of a noted hunting district, and

supplies pork pies to all parts of the country ; while **Ashby-de-la-Zouch** is the centre of a small coal-field. **Oakham** and **Uppingham** are two small agricultural towns in Rutland, the latter of which has a noted public school.

FIG. 115.—THE SIX WEST MIDLAND COUNTIES.



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4. THE SIX WEST MIDLAND COUNTIES. — Herefordshire is entirely an agricultural county. In all the others the occupations are divided between manufacturing, mining, and agriculture.

The two largest towns in this section are **Birmingham** and **Bristol**. **Birmingham** (919) in Warwickshire, is the largest town of the Midlands, and has for centuries been a great seat of the hardware manufacture ; iron, steel, and brass goods (such as pins, buttons, pens, arms, screws, engines, ornamental iron and brass work and many other things), jewellery, electroplate, glass, &c., are all made here. **Dudley**, **Bromsgrove**, **Stourbridge**

(glass and pottery), and **Redditch** (needles), in Worcestershire; and **Wellington**, **Coalbrookdale**, **Ironbridge**, and **Broseley**, in Shropshire, are also engaged in the hardware manufacture. Other manufacturing towns are **Kidderminster**, in Worcester, noted for carpets; **Worcester**, on the Severn, for china and gloves; **Coventry**, in Warwickshire (128), motor cars and bicycle manufactures; **Droitwich**, for its brine springs; and **Stroud**, in Gloucestershire, for its cloth manufacture.

Bristol (377), on the Avon, in Gloucestershire, has manufactures of sugar, tobacco, glass, and a considerable shipping trade. On the opposite side of the Severn, in Monmouth, is the port of **Newport** (92), on the Usk, one of the outlets of the South Wales mining district. **Gloucester** can be reached by vessels by means of the Berkeley Ship Canal.

Cheltenham, in Gloucestershire, **Malvern**, in Worcestershire, and **Leamington**, in Warwickshire, are celebrated watering-places.

Among the smaller towns in this section are **Rugby**, with its great public school, **Warwick**, with its fine castle, and **Stratford-on-Avon**, the birthplace of Shakespeare, in Warwickshire; **Oswestry**, **Ludlow**, **Bridgnorth**, and **Shrewsbury**, a picturesque old town, with a famous school, in Shropshire; **Leominster**, in Hereford; **Pontypool**, a mining town, and **Monmouth** and **Chepstow**, on the Wye, in Monmouthshire.

5. THE SEVEN SOUTH MIDLAND COUNTIES.—These are chiefly agricultural, except in the case of Middlesex, where London is a great manufacturing and commercial centre.

London, with suburbs, 7,476,168, the largest city, and the most important seaport in the world, is situated in the counties of Middlesex, Surrey, and Kent. In addition to its great shipping trade it has manufactures of beer, watches, silk, leather, sugar, pottery, hats, and many smaller articles. It is the seat of the British Parliament, of the Law Courts, and of the Government offices. (*See Ports.*)

Next in point of population comes **Northampton** (90), the centre of the boot and shoe trade; **Oxford**, situated at the junction of the Cherwell and Thames, the seat of our oldest and largest university; **Peterborough**, in Northamptonshire, on the Nen, an important railway junction; and **Luton**, in Bedfordshire, the centre of the straw-plaiting industry.

Of the other towns, the chief are **Woodstock**, noted for gloves, **Banbury**, and **Witney**, which manufactures blankets and gloves, in Oxfordshire; **Wellingborough** and **Kettering**, in Northamptonshire; **Huntingdon**, on the Ouse, the birthplace of Oliver Cromwell; **Bedford**, on the Ouse, with excellent schools. Here Bunyan wrote his 'Pilgrim's Progress,' and in the immediate neighbourhood lived the philanthropist John Howard.

Luton, in the same county, is the seat of the straw-plait manufacture; **Aylesbury**, the centre of a rich agricultural vale, **Great Marlow**, **High Wycombe**, **Buckingham**, on the Ouse, and **Eton**, with its famous public school, are in Buckinghamshire. In Hertfordshire are **Hertford**, on the Lea, **St. Albans**, noted for its famous abbey, now used as a cathedral, and **Hitchin**, with its lavender fields. In Middlesex are **Barnet**, **Harrow**, with its great public school, and **Tottenham**, a suburb of London.

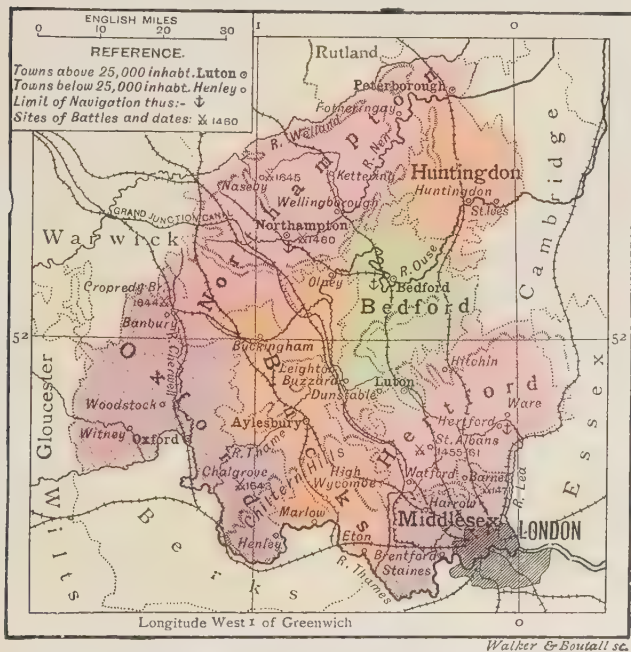
6. THE FIVE SOUTH-EASTERN COUNTIES.—Here the chief occupation is agriculture; the coast districts are also maritime and commercial.

Excluding London, the largest inland towns are **Croydon**, in Surrey

(190), which is almost a suburb of London, and **Reading** (92), with its large biscuit factories.

On the coast are the great naval stations of **Portsmouth** (247), in Hampshire, with the neighbouring towns of **Portsea** and **Gosport**, all strongly fortified; **Chatham**, on the Medway, with dockyards and a great naval arsenal, making with **Rochester** and **Stroud** one large town, and **Sheerness**, on the

FIG. 116.—THE SEVEN SOUTH MIDLAND COUNTIES.



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Isle of Sheppey. **Woolwich**, a suburb of London, is the chief Government arsenal. **Southampton** (160) is the principal commercial port on the south coast. **Newhaven**, on the Ouse, in Sussex, is a crossing-place to France. **Folkestone** and **Dover**, in Kent, are also important packet stations. **Dover** is the only one of the **Cinque Ports** (**Sandwich**, **Dover**, **Hythe**, **Romney**, and **Hastings**), which is still an important port; the harbours in this part of the coast having mostly silted up. **Rye** and **Winchelsea**, in Sussex, were afterwards added to the Cinque Ports. **Gravesend** marks the termination of the port of London. **Whitstable** is noted for its oyster beds.

There are also numerous watering-places on the coast. **Margate** and **Ramsgate** in **Thanet**; **Hastings** (66), **Eastbourne**, near **Beachy Head**, **Brighton** (142), the largest of English watering-places, **Worthing** and **Littlehampton**, in **Sussex**; **Cowes**, **Ryde**, and **Ventnor**, in the **Isle of Wight**; and the rapidly increasing town of **Bournemouth**, in **Hants**.

There are numerous small but important inland towns, which grew up mostly where the chief roads crossed the hills. Among these are **Maidstone**, on the Medway; **Canterbury**, with its fine cathedral, on the Stour; **Tunbridge** and **Tunbridge Wells**, noted for its medicinal waters, all in Kent. In Surrey are the towns of **Richmond** and **Kingston**, on the Thames; **Guildford** and **Farnham**, on the Wey; **Dorking**, on the Mole, **Reigate**, and **Epsom**. In Sussex are the towns of **Lewes**, on the Ouse; **Arundel**, on the Arun, and the cathedral city of **Chichester**. In Hampshire are **Winchester**, on the Itchen, formerly the capital of Saxon England; **Basingstoke**, **Andover**, **Aldershot**, with its great military camp, and **Christchurch**, at the mouth of the Avon. In Berkshire are **Windsor**, **Newbury**, on the Kennet, and **Abingdon**.

FIG. 117.—THE FIVE SOUTH-EASTERN COUNTIES.



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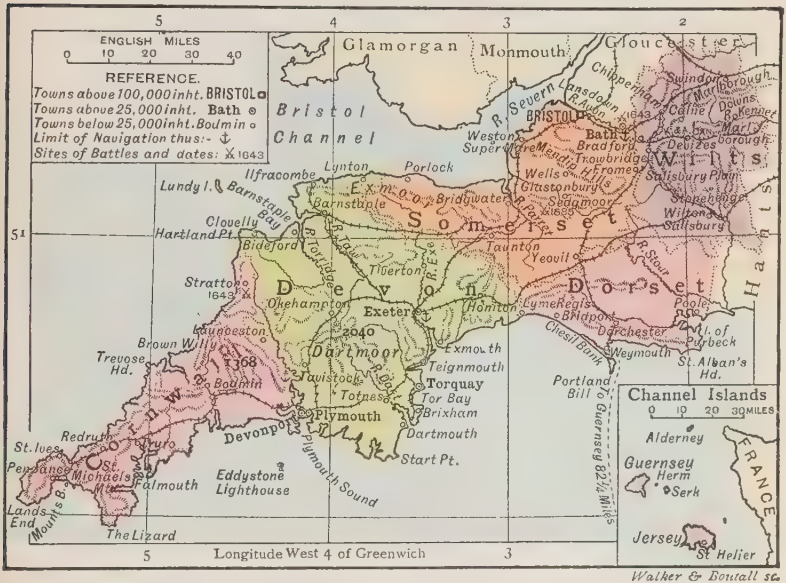
7. THE FIVE SOUTH-WESTERN COUNTIES.—Here the people are chiefly engaged in agricultural, maritime, and mining pursuits. The population is more evenly distributed, none of these counties having more than 300 to the sq. mile.

The only large inland town is **Bath** (68) on the Avon, in Somerset, noted for its hot springs as far back as Roman times. Of the other inland towns, the chief are **Salisbury**, in Wiltshire, on the Avon, with one of the finest cathedrals in England; **Wilton**, on the Willy, a seat of the carpet manufacture; **Trowbridge** and **Bradford**, with cloth factories; **Marlborough**, with a public school; **Swindon**, an important railway centre; **Devizes**, **Chippenham**, and **Calne**, where large quantities of bacon are cured. Near Salisbury are the extensive remains known as Stonehenge, and also the site of the once important town of Old Sarum. In Dorset and Somerset are the agricultural centres of **Dorchester** and **Taunton**, the small city of **Wells**, at the foot of the Mendip Hills, and **Yeovil**, which manufactures gloves. In Devon and

Cornwall are **Honiton**, noted for its lace, **Tiverton**, **Tavistock**, **Launceston**, and the mining towns of **Bodmin** and **Truro**.

The largest town on the coast is the important naval station of **Plymouth**, which with **Devonport** and **Stonehouse** make one large town of over 209,000 inhabitants. Among the other coast towns are the small ports of **Poole** and **Weymouth**, in Dorset; the cathedral city of **Exeter**, to which access for ships is maintained by a ship canal; **Teignmouth** the fishing town

FIG. 118.—THE FIVE SOUTH-WESTERN COUNTIES.



of **Brixham**, **Dartmouth**, and the old ports of **Bideford** and **Barnstaple**, in Devon; **Falmouth**, the fishing towns of **Penzance** and **St. Ives**, in Cornwall; and the port of **Bridgwater**, in Somerset.

The chief watering-places are **Torquay**, on Tor Bay, a noted resort of invalids; **Ilfracombe** and **Lynton**, on the North Devon coast; and **Weston-super-Mare**, in Somerset.

8. WALES.—In Wales the principal occupations are agriculture, mining and working in metals, and the making of flannel.

The largest towns are on the South Wales coal-field. **Cardiff** (200), on the Taff, is the chief coal-exporting port in England, and also smelts great quantities of iron. **Swansea** (157) also exports coal, and smelts copper and other metals. **Merthyr Tydfil** (81), which, with **Aberdare** and **Dowlais**, forms one Parliamentary borough with a population exceeding 100,000, is the centre of the mining district. **Neath** and **Llanelli** are also engaged in smelting metals.

Other towns on the coast are **Pembroke**, with its Government dockyard; **Fishguard**, a port recently improved, where Atlantic liners call and steam-

ships sail daily for Rosslare, in Ireland; **Milford, Cardigan, Carnarvon and Conway**, both of which possess very fine castles built by Edward I.; **Baumaris, Holyhead**, the packet station for Dublin, the small city of **Bangor**, and the mining town of **Flint**, on the Dee.

FIG. 119.—W ALES.



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The chief inland towns are Carmarthen, on the Towy; Haverfordwest, in Pembroke; Brecknock, on the Usk; Presteign and New Radnor, in Radnorshire: Newtown, Welshpool, and Montgomery, flannel-making towns

in Montgomeryshire; **Dolgelly**, the county town of Merioneth; the mining towns of **Wrexham** and **Ruabon**, **Denbigh**, the county town, and **Ruthin**, in Denbighshire; **Holywell** and **Mold**, both mining towns, and the little city of **St. Asaph**, in Flintshire.

The chief watering-places are **Tenby**, on Carmarthen Bay; **Aberystwith**, **Aberaeron**, and **Barmouth**, on Cardigan Bay; and **Llandudno** and **Rhyl**, on the north coast.

EXAMINATION PAPERS

- A. 1. How is England separated from Scotland? What are the principal dimensions from east to west at Dover, Yarmouth, Grimsby, and Newcastle?
2. Explain the rise of the land from east to west. How many main lines of elevation are there, and what is the difference between them?
3. What is the connection between the Pennines and the Cumbrian Group? What are the principal elevations in each?
4. What are the characteristic minerals found in the western elevations?
- B. 1. Name the three chief portions of the Welsh mountain system. Give the chief elevations.
2. Name the hills of the older formation extending from Land's End to the Wrekin.
3. Describe the Oolitic and Chalk Escarpments.
4. Give the situation of Kinderscout, Bow Fell, Ingleborough, Carnedd Llewellyn, Yes Tor, Inkpen Beacon, Longmynd, Bolton Head.
- C. 1. What are the principal lowland plains of England? Give their characteristic features.
2. How has the relief of England affected the country—(1) physically, (2) commercially, (3) historically?
3. What circumstances largely determine the character of the coast-line? Illustrate your answer from the coast of England.
4. Describe the east coast of England from Whitby to Dover, and draw a sketch-map to illustrate your answer.
- D. 1. What are the principal bends on the south coast? Give the chief harbours and points connected with them.
2. Describe the general outline of the west coast, and the first great opening in detail from Land's End to St. David's.
3. Describe the three chief English islands.
4. Where are the following, and mention any facts of interest connected with them:—Spurn Point, Hunstanton Point, North Foreland, Beachy Head, the Lizard, Guernsey, St. Mary's, Menai Strait, Formby Point, St. Bees Head, Thanet, Braichy-y-Pwll?
- E. 1. Show how the tides and lighting of the coast are advantageous to commerce.
2. What are the principal causes affecting the climate of England?
3. What are the rivers draining into the North Sea? Where do they rise?
4. Describe the Thames.
- F. 1. What is the character of the districts drained by the rivers flowing into the Humber?
2. Describe the basin of the Mersey.
3. What rivers flow into the English Channel?
4. Give the situation of the following rivers:—Lune, Teifi, Taff, Parret, Ouse, Wensum, Waveney, Wansbeck, Orwell, and Stour.

- G. 1. What are the chief English lakes? Give their situation.
 2. What are the chief agricultural products, and say where they are grown?
 3. Give the chief fishing ports of England.
 4. Give reasons why England is a great mining country.
- H. 1. What are the chief coal-fields?
 2. Describe the cotton manufacture. Why is it located in Lancashire?
 3. What industries are connected with Rotherham, Newcastle, St. Helens, Wakefield, Kendal, Stroud, Wilton, Macclesfield, Droitwich, Darlington, Lincoln, Swansea, Coventry, and Stourbridge?
 4. Why are the chief manufactures situated on the coal-fields? Name the chief industries of each coal-field.
- I. 1. Name the chief manufacturing towns not situated on the coal-fields, and say what industries are connected with them.
 2. Compare the foreign trade of the United Kingdom with that of other countries.
 3. Give the ten chief imports and exports. State the countries from which we obtain the imports, and to which we send the exports.
 4. What are the chief seaports of England? Where are they situated, and what is the nature of their traffic?
- J. 1. Trace the course of the main line of the following railways:—Midland, Great Northern, Great Western, Great Eastern, and London and North-Western.
 2. How have the English counties obtained their names? Give three examples from each source.
 3. What are the principal towns in Northumberland and Durham? What is their chief industry?
 4. Name the watering-places on the coast from Cromer to Ilfracombe.
- K. 1. Give the chief towns in Essex, Somerset, Glamorgan, Kent, and Leicester.
 2. What are the following noted for:—Cleveland, Hallamshire, Grantham, Swindon, Crewe, Doncaster, Sheerness, Newhaven, Wrexham, Workington, Coalbrookdale, Tunbridge Wells, and Cheltenham?
 3. Which are the most densely peopled counties in England, and state why this is the case?
 4. Name (a) the chief centres of higher education; (b) the most noted cathedrals of England.

SCOTLAND

POSITION AND BOUNDARIES.—Scotland forms the northern portion of Great Britain, and is the lesser of the two portions into which that island is divided by the **Cheviot Hills**.

It is bounded on the **east** by the **North Sea**; on the **north** and **west** by the **Atlantic Ocean**; and on the **south** by the **Irish Sea** and **Cheviot Hills**.

The **North Channel**, which separates the South-west of Scotland from Ulster, is only 13 miles across in its narrowest part.

FIG. 120.—SCOTLAND: RELIEF



SIZE.—Area, 30,000 sq. miles, including the numerous islands, which have a total area of 3,700 sq. miles.

Greatest length, 288 miles, from **Duncansby Head** to **Mull of Galloway**.

Greatest breadth, 150 miles in the latitude of **Kinnaird's Head**.

The shape is very irregular, and, being very deeply indented, the width varies from about 30 miles, between the heads of the Firths of Clyde and Forth, to 150 miles.

RELIEF.—With the exception of a small area, Scotland is covered with mountains in groups and short ranges, with long valleys generally sloping towards the east. Hence all but one of the long rivers flow into the east coast.

The country is divided naturally by two depressions into three mountainous regions, viz.:

1. The Northern Highlands.
2. The Central Highlands.
3. The Southern Uplands.

It is usual to speak of Scotland as being divided into **Highlands** and **Lowlands**, but a better idea is obtained by regarding the Lowlands as further divided into a **lowland region** and a **highland region**—viz. the **Southern Uplands**.

1. **THE HIGHLANDS.**—The **Highlands** are a region of high plateaux consisting of rolling uplands with mountain ranges and high peaks, great stretches of moorland covered with heather in the autumn where sheep are kept and where large districts have been converted into deer forests; mountain streams flowing into rapid rivers and lakes set deep in the valleys.

The **Highlands** comprise the whole of Scotland north of a line from **Greenock** to **Stonehaven**: but in this region there are several districts of comparatively low elevation (*i.e.* less than 500 ft.)—*e.g.* the county of **Caithness** and the coast country from **Moray Firth** to near **Aberdeen**.

The **Highlands** are divided into two portions, **Northern** and **Central**, by **Glenmore**, a long, deep, and narrow valley which stretches from **Moray Firth** to **Loch Linnhe**.

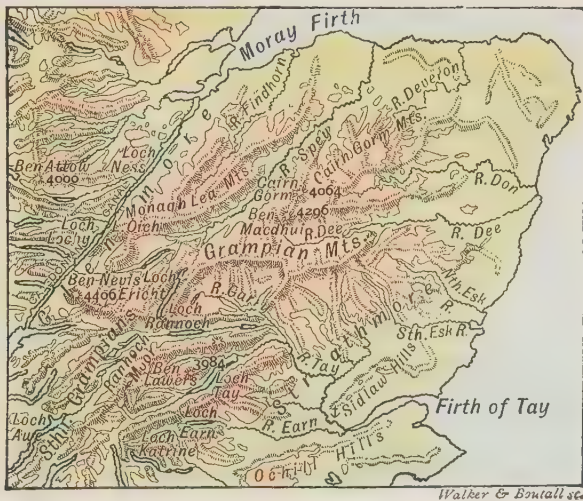
To the north of **Glenmore** a kind of central ridge may be traced from north to south, nearer to the west than to the east coast, with short ranges running from it east and west. These mountains are known as the **Northern Highlands**. Some of the chief peaks are—**Ben Attow**, 4,000 ft.; **Ben Wyvis**, 3,429 ft.; and **Ben Dearig**, 3,551 ft.

2. **THE CENTRAL HIGHLANDS.**—The great central masses of the Highlands lie between **Glenmore** and **Strathmore**, and here the ranges are more clearly defined.

From **Ben Nevis**, 4,406 ft. (the highest mountain in the British Isles), several ranges stretch in various directions. The chief of these, the **Grampian Range**, about 100 miles in length, includes the **Cairn Gorm Range**, which diverges to the north east, and it is also sometimes considered to embrace the **Monagh Lea Range** between **Strathspey** and **Glenmore**.

The most familiar peaks are **Ben Nevis**, 4,406 ft., and **Ben Macdhui**, 4,296 ft.; but there are in all about eight peaks more than 4,000 ft.

FIG. 121. —THE GRAMPIANS.



From the central range of the Grampians numerous spurs extend to the south and south-east. The range which stretches from Ben Nevis to the Firth of Clyde is called the **Southern Grampians**, in which the chief height is **Ben Cruachan**. Amongst those ranges which stretch to the south-east are **Ben Lomond**, 3,192 ft.; **Ben Lawers**, 3,984 ft.; and **Schiehallion**, 3,547 ft.

Strathmore (Great Strath or Plain), the largest plain in Scotland, extends for ninety miles across the country from north-east to south-west on the southern border of the Highlands, and has a width of from one to sixteen miles.

The Lowlands.—This portion of Scotland falls into the following natural divisions—

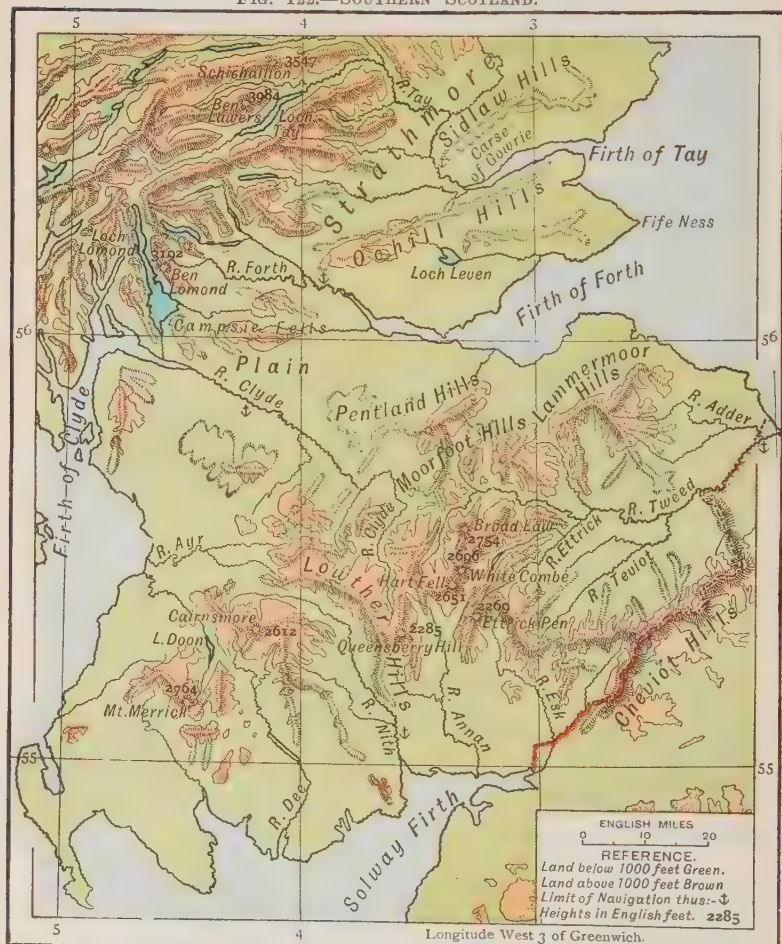
(a) The plain known as **Strathmore**.

(b) A hilly region, consisting of **Sidlaw Hills**, north of the Firth of Tay; **Ochill Hills**, from the river Tay to the river Forth;

and **Campsie Fells**, between the Forth and Clyde, near Dumbarton.

(c) A plain between the **Clyde** and **Forth**.

FIG. 122.—SOUTHERN SCOTLAND.



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(d) The **Southern Uplands**, filling the greater part of the country between the plain (c) and the Cheviot Hills.

(a), (b), and (c) may be said to form the **Central Lowlands**.

3. THE SOUTHERN UPLANDS.—This region consists of well-defined districts, viz. :—

1. A plateau, of which the northern edge forms the **Lamer-moor** and **Moorfoot Hills**.

2. A hilly region, containing the **Lowther** and **Pentland Hills**, stretching from near the Firth of Clyde to the Cheviot Hills, and dividing the tributaries of the Tweed and Clyde from the rivers which flow into the Solway Firth.

3. A hilly region filling the south-west corner of Scotland. The chief peaks in the Southern Uplands are **Mount Merrick**, 2,764 ft. ; **Broad Law**, 2,754 ft. ; **White Combe**, 2,696 ft. ; **Hart Fell**, 2,651 ft. ; also **Ettrick Pen**, **Queensberry Hill**, and **Cairnsmore**.

LAKES.—Scotland is famous for the many lovely lakes, known as **lochs**, which occupy the valleys both at high and low levels. Their beauty completes the charm of the Highlands, where heath-covered mountains mirror themselves in placid lakes, making pictures not to be surpassed. Lakes in mountain districts occupy the lowest level of the valleys, and receive the drainage of the countless streams flowing down the surrounding high land. A stream issues from the lower end of the lake, often forming a cataract, and, proceeding to a lower valley, sometimes forms another lake. Thus the streams from **Lochs Lydoch** and **Ericht** unite to form **Loch Rannoch**, from which issues the river **Tummel**, a tributary of the **Tay**. The **Tay** receives the waters of numerous lakes lying in the valleys sloping from the main ridge of the **Grampians** to the south-east.

The chief lakes are as follows :—

Loch Lomond, 24 miles long, 7 miles in greatest width (45 sq. miles), is the largest lake in Great Britain, and has on its eastern side **Ben Lomond**, the most frequently climbed mountain in Scotland. The beauty of this lake is enhanced by the many charming islands which, covered with trees, dot its surface. The loch drains into the **Clyde** by the river **Leven**.

To the east of **Loch Lomond** are **Lochs Katrine**, **Achray**, and **Vennachar**, which, with the neighbouring district called the **Trossachs**, have been made familiar by Scott's 'Lady of the Lake.' These three lakes drain into the **Forth** by its tributary the **Teith**.

Other large and beautiful lakes are **Loch Awe**, 23 miles long, in **Argyle-shire** ; **Lochs Tay**, 14 miles long, **Ericht**, **Rannoch**, **Lydoch**, and **Earn**, all except **Awe** feeding the **Tay**.

Loch Leven, in **Kinross**, is the largest body of water in Scotland not in the Highlands, and contains on one of its four islands the ruins of **Loch Leven Castle**, in which **Queen Mary** of Scotland was imprisoned.

Lochs Ness, **Oich**, and **Lochy** lie in **Glenmore**, and rendered the construction of the **Caledonian Canal** comparatively easy.

Lochs Shin and **Maree** are the largest lakes among the Northern Highlands.

Many small lakes lie among the Southern Uplands, as **Loch Doon**, in **Kirkcudbright**.

PLATEAUX.—Many portions of the Highlands are elevated, and form the moors, a large part of which are reserved for grouse shooting or as deer forests. Of these, one of the largest is the desolate **Rannoch Moor** to the north of **Ben Cruachan**.

The Northern Highlands are largely plateaux, the county of **Sutherland** being almost entirely of this character.

PLAINS.—**Strathmore**.

Plain of **Caithness**, occupying a large part of that county, and having a general elevation of less than 200 ft.

Plain of **Clyde and Forth**, a very level and fertile tract of country stretching from sea to sea.

Plain of **Ayrshire**, famous for its cattle.

Between the Sidlaw Hills and the Firth of Tay is the well-known plain called the **Carse of Gowrie**.

VALLEYS.—In the Highlands the valleys are called **glens** or **straths** (both Celtic words), as **Glenmore** and **Strathspey**.

In the south the term **dale** (Scandinavian, *daal*; German *thal*) is generally used, as **Clydesdale**, **Tweeddale**, &c.

COAST LINE.—Generally speaking, the west coast is more indented and is higher than the east coast, though in the latter are considerable stretches of cliffs, and all the eastern capes, except **Fife Ness**, are bold headlands. The rocks also are generally harder in the west and the sea deeper than in the east. The coast from **Kinnaird's Head** to **Moray Firth** is bordered by sand dunes. The north coast is a line of high wild cliffs from **Duncansby Head** to **Cape Wrath**, which is a mass of gneiss 300 ft. high.

Openings.—The chief firths on the east are: **Firth of Forth**, **Firth of Tay**, **Moray Firth**, into which **Loch Beaully** and **Cromarty Firth** open, and **Dornoch Firth**.

The firths on the east coast are similar to the fjords of Norway (from which the name is derived) in being long and narrowing towards the interior, but are not so deep, neither are they bordered by such high land.

In the North, **Pentland Firth** is more properly a channel between the mainland and the Orkney Islands than a firth.

In the West, with the exception of the Firths of **Solway**, **Lorne**, and **Clyde** (into which **Gare Loch** and **Loch Long** open), the narrow indentations are called **lochs**. The chief are **L. Broom**, **L. Linnhe**, **L. Fyne**, and **L. Ryan**.

In the South are **Luce Bay** and **Wigton Bay**, opening into the Irish Sea.

STRAITS.—**Kilbrennan Sound**, between Arran and Kintyre.

Sound of Bute, between Arran and Bute.

Sound of Jura, separating Jura from Kintyre.

Sound of Mull, between Mull and the mainland.

Sound of Sleat, between Skye and the mainland.

The **Minch** and **Little Minch**, separating the Outer from the Inner Hebrides and from the mainland.

CAPIES.—**East Coast.**—**St. Abb's Head**, **Fife Ness**, **Buchan Ness**, **Kinnaird's Head**, **Tarbet Ness**.

North Coast.—**Duncansby** and **Dunnet Heads**, **Cape Wrath**.

West Coast.—**Ardnamurchan Point**, **Mull of Kintyre**.

South Coast.—**Mull of Galloway**, terminating the peninsula known as the **Rhinns** of Galloway, and **Burrow Head**.

On Islands.—**Butt of Lewis**, **Barra Head** (southern extremity of Outer Hebrides), and **Point of Aird** (Skye).

ISLANDS.—The islands of Scotland, with the exception of a few rocks, are on the west and north.

1. **Western Islands.**—These consist of the **Hebrides** and the **Islands of the Firth of Clyde**.

The **Hebrides** are divided into **Outer** and **Inner** groups. Many of the **Inner Hebrides** are mountainous, especially **Skye**, with **Cuchullin Hills**, 3,000 ft. ; **Mull**, with **Ben More**, 3,185 ft. ; **Jura**, with the **Paps of Jura**, 2,569 ft.

The **Outer Hebrides** are separated from the mainland and the **Inner Hebrides** by the channels called **The Minch** and the **Little Minch**, and consist of **Lewis**, the southern part of which is called **Harris**, **North and South Uist**, and **Benbecula**.

St. Kilda is a small island 42 miles west of the **Outer Hebrides**, and is the resort of countless wild fowl.

Rockall is a small uninhabited island 140 miles still further west.

The **Outer Hebrides** are of relatively low elevation, being mostly under 500 ft. above the sea, and consist chiefly of bleak stretches of wind-swept bogs or moorlands. The soil supports but few inhabitants, who combine fishing with farming to obtain a livelihood.

The **Inner Hebrides** consist of **Skye**, **Mull**, **Jura**, **Islay**, **Rum**, **Eigg**, **Coll**, **Tiree**, **Colonsay**, and **Oronsay**.

Near **Mull** are the small islands of **Iona** or **Icolmkill** and **Staffa**, the former famous for its ancient Christian church and existing ecclesiastical relics ; the latter for **Fingal's Cave**, of the same basaltic formation as **Giant's Causeway** on the opposite coast of Ireland.

The islands in the **Firth of Clyde** are **Arran**, a thinly-peopled island, with beautiful scenery, **Goat Fell** being the chief height ; **Bute**, on which is **Rothsay**, a popular watering-place ; the islets of **Great and Little Cumbrae** and **Ailsa Crag**.

2. **Northern Islands.**—These are in two groups, **Orkney** and **Shetland Islands**.

The **Orkney Islands**, separated from the mainland by **Pentland Firth**, consist of sixty-seven islands, of which forty are uninhabited.

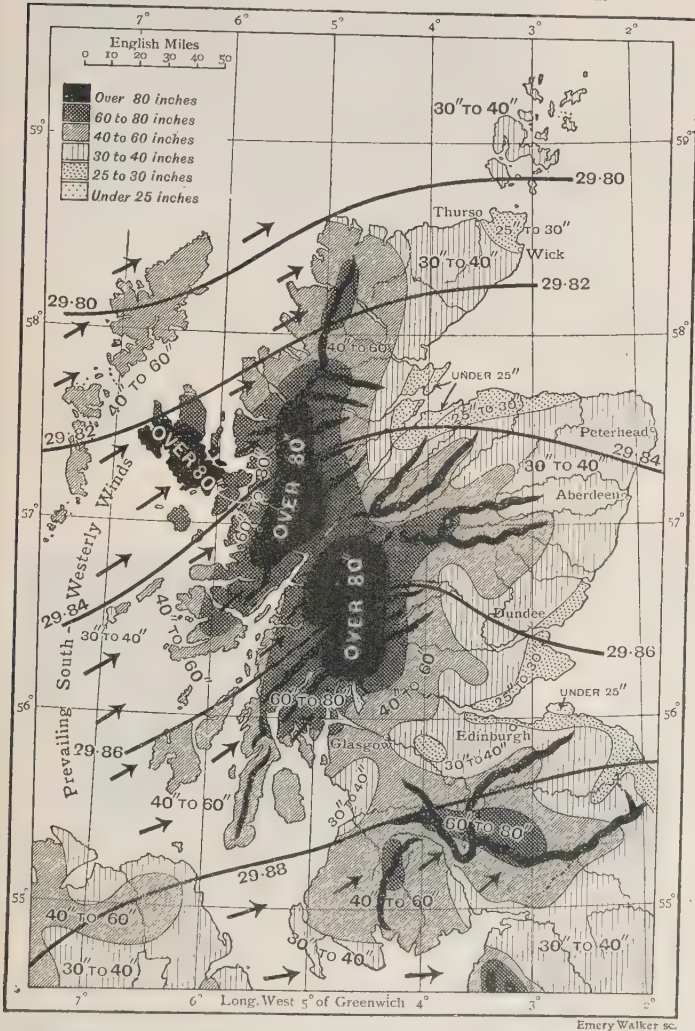
The largest are **Pomona** or **Mainland**, **Hoy**, **North and South Ronaldshay**, and **Westra**.

FIG. 123.—SCOTLAND: PHYSICAL



The **Shetland Islands** lie to the north of the Orkneys, and consist of over one hundred islands, of which thirty or forty are inhabited.

FIG. 124.—SCOTLAND : ANNUAL RAINFALL AND ISOBARS.



Emery Walker sc.

The chief are **Mainland** (52 miles long, and of irregular shape), **Yell**, **Unst**, and **Fetlar**.

FIG. 126.—SCOTLAND: JULY ISOTHERMS.

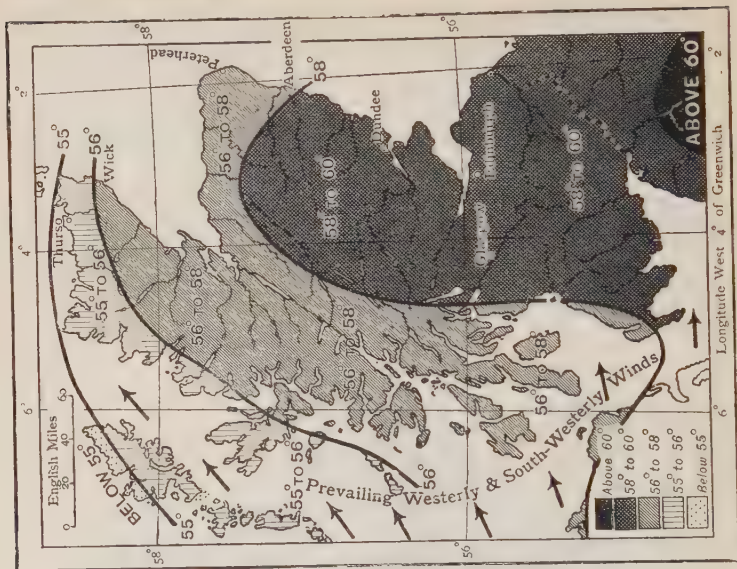


FIG. 125.—SCOTLAND: JANUARY ISOTHERMS.



The highest points in both these groups are about 1,500 ft. above the sea-level.

These islands generally resemble each other in having precipitous coasts, and a surface mostly consisting of boggy or heathy wastes. The climate is moist, but remarkably mild for the latitude. The inhabitants are engaged in fishing, farming, and knitting. The farm produce is chiefly barley, sheep, and horses of very small size.

Eastern Islands.—These are the small rocky islets : **Bass Rock**, **Inchkeith**, and **Inchcolm**, in the Firth of Forth ; **Bell** or **Inchcape Rock**, off the Firth of Tay.

CLIMATE.—The climate of Scotland is very similar to that of England, with a somewhat lower mean annual temperature, caused mainly by the difference in latitude. Thus the mean annual temperature of Edinburgh is 47° , Aberdeen 49° , and Wick 46.9° , as compared with London, 50.8° . The rainfall in the west is greater than in the east, as in England, and from the same causes.

The local causes influencing the climate of Scotland are :

1. Its insular position, which tends to make the temperature more equable.
2. The prevailing westerly winds, which bring moisture from the Atlantic
3. The influence of the west winds, which are mild and moist, upon the rainfall and temperature of the west coast.
4. Its average elevation above the sea-level, which causes great condensation to take place, and so increases the rainfall and also makes the winter severe in the mountain districts.

PRACTICAL EXERCISES.

1. Explain why in the winter the temperature of the district marked "Below 38° " (Fig. 125) in the north is so much lower than that of the west coast in the same latitude.
2. Why should there be two districts, one in the north and the other in the south, both "Below 38° " in the winter, in spite of the difference in latitude ?
3. The general direction of the winter isotherm of 40° is nearly north and south. Explain this.
4. The summer isotherm of 58° lies nearly N. and S. for the greater part of its direction. How do you account for this ?

RIVERS.—Scotland is an extremely well-watered country ; but, from the elevation of the sources and the comparatively short courses of the rivers, they are only of little use in navigation.

As in England, the long slopes are mostly towards the east, and thus the longest rivers nearly all flow in that direction.

The chief rivers are :

- (a) **Flowing into the east coast :** **Tay**, 100 miles long ; **Spey**, 96 miles ; **Tweed**, 96 miles ; **Dee**, 87 miles ; **Forth**, 60 miles ; **Don**, 50 miles ; **Deveron**, **Findhorn**, **North and South Esk**.
- (b) **Into the west coast :** **Clyde**, 98 miles.
- (c) **Into the south coast :** **Nith**, 60 miles ; **Annan**, **Esk**.

The **Tay** (100 miles) drains the southern slopes of the **Grampians**, finding its sources in the numerous lochs among those mountains, draining

FIG. 127.—THE RIVER TAY.



FIG. 128.—THE RIVER CLYDE.

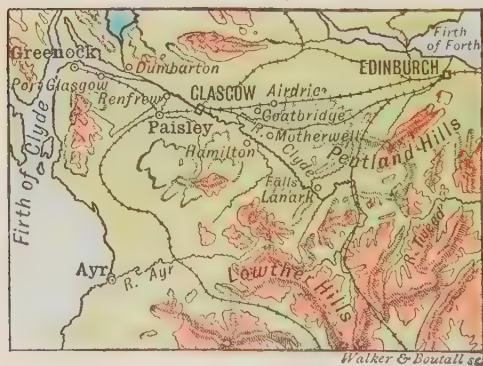
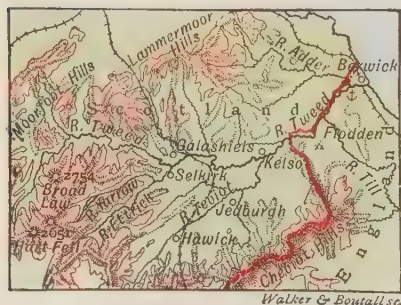


FIG. 129.—THE RIVER TWEED.



Lochs **Rannoch**, **Tay**, **Earn**, and others. The chief tributaries are the **Almond** and **Earn** on the right bank, and the **Tummel**, which receives the **Garry**, on the left. The Tay is not navigable above **Perth**.

The **Clyde** (98 miles) rises in the **Lowther Hills**, within a very short distance of the **Tweed** and **Annan**, which flow respectively to the North Sea and Solway Firth. This river flows in a north-westerly direction, and after falling 230 feet in three falls, the **Falls of Clyde**, enters the Firth of Clyde. Below **Glasgow** the river has been made navigable for the largest ships. The lower course of the river is through an extensive coal field, and hence numerous industries have sprung up, with a dense population. The chief towns are **Glasgow**, through which the river flows; **Renfrew**, **Port Glasgow**, and **Greenock** on the left bank; and **Dumbarton** on the right.

The **Spey** flows through **Strathspey** between the **Cairngorm** and **Monagh Lea** Mountains, in a north-east direction, to the North Sea. It is famous for its turbulence.

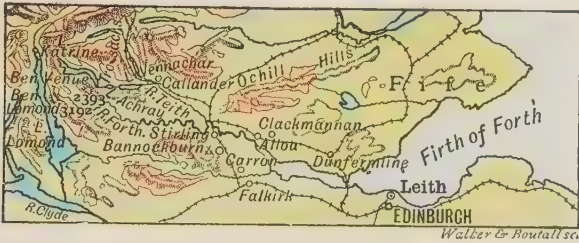
The **Tweed** drains a large part of South-east Scotland and a part of Northumberland. It receives many tributaries, of which the chief are the **Yarrow**, **Ettrick**, **Teviot**, and **Till** on the right; **Adder** on the left. The dales through which these streams flow are famous

for the manufacture of tweed cloth at the towns of **Hawick**, **Jedburgh**, **Galashiels**, and **Selkirk**. The Tweed is noted for its salmon fisheries.

The **Forth** flows only 60 miles from its source to **Alloa**, where it joins its estuary, the **Firth of Forth**, which is 50 miles long, and affords a safe water-way for the largest vessels. The chief town on the Forth is **Stirling**.

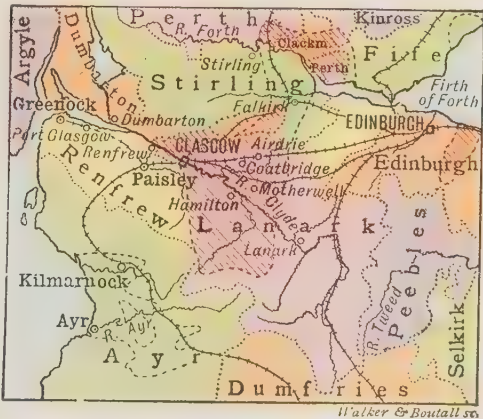
FERTILITY OF SOIL.—From the mountainous nature of the surface, less than one-fourth of the soil of Scotland is arable

FIG. 130.—THE RIVER FORTH.



and grass-land; and of this the greater part is found in what is called the **Central Lowlands**, the district between a line drawn from **Stonehaven** to the **Clyde** opposite **Greenock**, and one from **Dunbar** to the middle of the **Ayrshire** coast. This district also contains the bulk of the mineral wealth of Scotland, and hence the greater part of the population of the country live within its limits. Notwithstanding the uncertainty of the climate, Scottish farming is famous for its excellence, especially in the **Lothians**.

FIG. 131.—SCOTCH COAL-FIELDS.

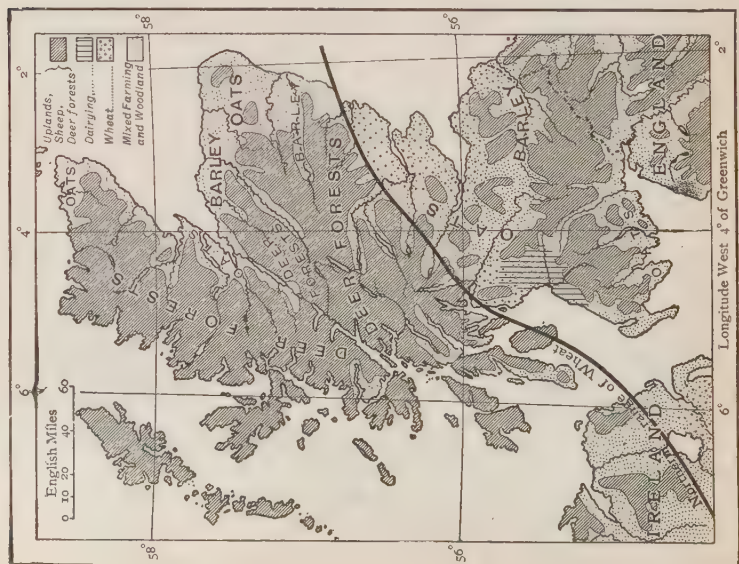


NOTE.—Coal-fields are shewn by diagonal lines.

PRODUCTS.—1. **Agricultural.**—The chief products are **oats** (the most widely cultivated and the national cereal), **barley**, **wheat**, **flax**, **potatoes**, **turnips**, and the ordinary green crops of England.

Many districts, especially **Ayrshire**, are noted for the quality of their cattle and dairy produce.

FIG. 132.—SCOTLAND: DISTRIBUTION OF CROPS



Emery Walker sc

FIG. 133.—SCOTLAND: COAL-FIELDS, MANUFACTURES, RAILWAYS.



Emery Walker sc

2. Mineral.—Most of the mineral wealth is derived from the **Central Lowlands**.

The chief minerals are **coal**, **iron**, and **lead**. Others are **building stone**, **oilshale**, **roofing-slates**, and **fire-clay**.

Coal-fields.—Coal is mostly obtained from two coal-fields.

1. The **Clyde Basin Coal-field**, extending eastward to **Clackmannan** and **Fifeshire**.

2. The **Ayrshire Coal-field**, occupying a large portion of that county.

There are two small coal-fields on the east—one near **Edinburgh**, and the other on the opposite coast of **Fife**.

Iron is abundant and is generally found in the Coal Measures, as in England. It is worked at **Glasgow**, **Airdrie**, and **Coatbridge**; also at **Falkirk** and **Carron**.

Lead is obtained in the **Lowther Hills**, on the borders of **Lanark** and **Dumfries**.

Granite is the most valuable of the building-stones, and is largely quarried at **Aberdeen** and **Peterhead**; **oilshale**, for the extraction of **paraffin**, is obtained in **Linlithgow** and **Midlothian**; **roofing-slates** in **Argyleshire**; **fireclay** in the coal districts.

3. Fisheries.—The value of fish landed in Scotland in 1922 was nearly four million pounds.

MANUFACTURES.—1. **Cotton**; 2. **Linen**; 3. **Jute**; 4. **Woollen**; 5. **Iron**, including ship-building. Others are **soap**, **whiskey**, **ale**, and **paper**.

1. **Cotton** is chiefly manufactured in the counties of **Lanark** and **Renfrew** at **Glasgow** and **Paisley**; also in the counties of **Ayr**, **Aberdeen**, and **Perth**.

2. **Linen** chiefly at **Dundee**, which trades largely with **Russia**, the greatest flax-growing country in Europe; also at **Arbroath**, **Montrose**, and **Dunfermline**.

3. **Jute** at **Dundee**, where it was first manufactured.

4. **Woollen.**—Tweed cloths in the Tweed basin at **Hawick**, **Jedburgh**, **Galashiels**, and **Selkirk**; woollen hosiery at **Dumfries**; carpets and other goods at **Ayr** and **Kilmarnock**.

5. **Iron.**—Smelting at **Airdrie** and **Coatbridge** in **Lanarkshire**, and also in **Ayrshire**; ironworks at **Falkirk** and **Carron** in **Stirlingshire**; machinery at **Kilmarnock**; ship-building on the **Clyde** at **Glasgow**, **Port Glasgow**, **Dumbarton**, and **Greenock**.

TRADE.—Of the total trade of the United Kingdom, about one-twelfth belongs to Scotland.

MEANS OF INTERNAL COMMUNICATION.—The numerous and deep indentations afford means of access to a large portion of the country. The rivers are of little use in navigation. The roads and railways generally

follow the natural depressions in the surface. Until recently only one good road existed from the Lowlands to the Highlands—viz. up the valley of the **Garry**, down that of the **Spey**, and so to **Inverness** and the North. Now excellent roads afford communication in nearly all parts. The **eastern** and **southern** districts are well supplied with railways, but on the west **Oban** and **Strome** are the only places north of the Clyde attainable by rail.

The great railway bridges over the Firths of **Forth** and **Tay** have much expedited travelling in the east. The Forth Bridge, built upon the cantilever principle, is one of the engineering wonders of the world.

CANALS.—The nature of the surface has caused the construction of canals to be generally difficult, and hence there are but few, viz. :—

1. The **Caledonian Canal**, through Glenmore, from Loch Linnhe to Moray Firth, formed by joining Lochs Ness, Oich, and Lochy, and designed to save vessels the voyage through the Hebrides and the Pentland Firth.

2. **Forth and Clyde Canal**, joining the mouths of the rivers so named.

3. **Crinan Canal**, from Loch Fyne to the Sound of Jura, affording a ready passage from Glasgow to the Hebrides.

FOREIGN TRADE.—Scotland has about 8 per cent. of the foreign trade of the British Isles, but it must be remembered that considerable quantities of goods landed at English ports find their way to Scotland.

Imports.—Like those of England, the imports consist mostly of raw materials for manufactures, with colonial and tropical produce and food stuffs.

Exports.—In addition to manufactured goods, Scotland exports a considerable amount of farm produce to England, as cattle, sheep, and oats.

SEAPORTS.—Glasgow (1,034), Leith (80), Greenock (81), Dundee (167), Aberdeen (159), Ayr, Stranraer, Ardrossan, Peterhead, Fraserburgh, Wick.

Glasgow (1,034), on both banks of the Clyde; the greatest seaport and manufacturing city of Scotland. It has numerous manufactures, of which ship-building and manufacture of machinery are the chief. Like Liverpool, it has risen in consequence of the development of trade with America. Its manufactures depend for coal and iron upon the adjoining coal-field. The Clyde has been deepened to such an extent that the largest vessels now reach Glasgow, whereas formerly Port Glasgow, 16 miles nearer the sea, was the limit of navigation. This city has an ancient cathedral, and a university with about 2,000 students.

Leith is the port of Edinburgh, on the Firth of Forth, and has considerable import trade.

Dundee (168) imports jute from India and flax from Russia, and exports linen, jute, and hemp stuffs.

Greenock (81) imports and manufactures large quantities of sugar. It is an important centre for ship-building and machinery.

Aberdeen (159), **Ayr**, and **Ardrossan** have considerable coasting trade.

Wick, **Peterhead**, and **Fraserburgh** are fishing towns.

Stranraer is a packet station with shortest passage to Ireland.

COUNTIES OF SCOTLAND, WITH THEIR CAPITALS.

<i>County</i>	<i>Capital</i>	<i>Situation</i>
Bute	Rothesay	Firth of Clyde
Argyle	Inverary	Loch Fyne
Kincardine	Stonehaven	North Sea
Perth	Perth	River Tay
Forfar	Forfar	In Strathmore
Aberdeen	Aberdeen	River Dee
Banff	Banff	River Deveron
Elgin	Elgin	River Lossie
Nairn	Nairn	River Nairn
Inverness	Inverness	River Ness
Ross and Cromarty	Dingwall	Cromarty Firth
Sutherland	Dornoch	Near entrance of Dornoch Firth
Caithness	Wick	Wick Harbour
Orkney	Kirkwall	Island of Pomona
Shetland	Lerwick	Mainland
Ayr	Ayr	River Ayr
Renfrew	Renfrew	On a small tributary of Clyde
Lanark	Lanark	River Clyde
Dumbarton	Dumbarton	River Clyde
Stirling	Stirling	River Forth
Linlithgow	Linlithgow	On a small lake
Edinburgh	Edinburgh	Near Firth of Forth
Haddington	Haddington	River Tyne
Clackmannan	Clackmannan	Near Firth of Forth (north side)
Fife	Cupar	—
Kinross	Kinross	River Leven
Berwick	Greenlaw	River Blackadder
Peebles	Peebles	River Tweed
Dumfries	Dumfries	River Nith
Roxburgh	Jedburgh	Tributary of Tweed
Kirkcudbright	Kirkcudbright	River Dee
Wigtown	Wigtown	Wigtown Bay
Selkirk	Selkirk	River Ettrick

DISTRICTS AND TOWNS.—1. **The Highlands.**—This section of Scotland comprises the following counties:—Bute, Argyle, Kincardine, Perth, Forfar, Aberdeen, Banff, Elgin, Nairn, Inverness, Ross and Cromarty, Sutherland, Caithness, Orkney and Shetland, but Perth and Forfar extend into the Central Lowlands.

The islands are apportioned thus:—Orkneys and Shetlands form the counties of those names. Lewis belongs to Ross. Skye, the southern islands of the Outer Hebrides, and Eigg, form part of Inverness. Mull, Islay, Jura, and the adjoining small islands, are included in Argyleshire. Arran and Bute form the county of Bute.

Aberdeen (159), at the mouth of the Dee, is the seat of a university, has manufactures of cotton and linen, considerable coasting trade and fishing industries.

Inverness (22), a well-built town at the mouth of the R. Ness, is the capital of the Highlands.

Fraserburgh and **Peterhead**, on the north-east coast, are fishing towns. The latter is also well known for the granite quarried near and exported.

Wick, a small town on the Caithness coast, is the centre of a great fishing industry, in which fishermen of several nations participate.

Stornoway, in Lewis, is the largest town in the Hebrides.

Oban, in the west of Argyleshire, is the great centre for tourists and yachtsmen in the West of Scotland.

Rothesay, in Bute, is a popular watering-place within easy reach of the Clyde ports by steamer.

2. **Central Lowlands**, consisting of the counties of Ayr, Renfrew, Lanark, Dumbarton, Stirling, Linlithgow or West Lothian, Edinburgh or Mid Lothian, Haddington or East Lothian, Clackmannan, Fife, Kinross, and parts of Forfar and Perth.

Glasgow (1,034). *See* Seaports. (Including suburban districts, over a million.)

Edinburgh (420), (Edwin's Burgh, named from Edwin of Northumbria), with Leith, has been the capital of Scotland since 1437. It is the seat of the Supreme Scottish Law Courts, of a university and other educational establishments, and is famous for the beauty of its situation and of its buildings. Two of its most remarkable buildings are the Castle and Holyrood Palace. Like London, Edinburgh has always been the home of many persons of wealth, as well as of men and women of letters. Edinburgh is often spoken of as the modern Athens.

Dundee (168), an important seaport on the north of the Firth of Tay, and also a busy manufacturing town, having linen, jute, and hemp industries. A great railway bridge, successor to the ill-fated one which fell in the great storm of December 29, 1879, connects the town with the opposite coast of Fife.

Perth (33), on the R. Tay above its confluence with the Firth, is noted for its dye-works.

St. Andrew's (9), a town on the Fife coast, has an ancient history and possesses the oldest university in Scotland.

Paisley (84), in Renfrewshire, is an ancient manufacturing town which has given its name to a kind of shawl, but is now chiefly engaged in the making of thread.

Greenock (81), an important seaport on the left bank of the Clyde estuary.

Coatbridge and **Airdrie**, towns on the Clyde and Forth coal-field engaged in mining and iron-working.

Stirling (21), on the R. Forth, was once the capital of Scotland, and commanded the road to the Highlands.

Ayr is a small port and manufacturing town on the Ayrshire coast.

Kilmarnock is an inland town in Ayrshire, with some woollen manufactures.

3. **Southern Uplands**.—Counties of Berwick, Peebles, Dumfries, Roxburgh, Kirkcudbright, Wigtown, Selkirk.

In the dales of the Tweed basin are the cloth manufacturing towns. **Jedburgh**, **Galashiels**, **Selkirk**, **Hawick**.

Dumfries is of some importance as being the centre of an agricultural district, and has some woollen manufactures.

PLACES OF HISTORIC INTEREST (not previously described in this chapter):

Scone, in Perthshire, the ancient crowning place of the Scottish kings, who were crowned upon the famous stone which was removed by Edward I. and placed in Westminster Abbey. Charles II. was crowned here in 1651.

Falkirk, near the R. Carron, famous for the victory of Edward I. over Sir William Wallace in 1298, and that of Prince Charles Edward, the Young Pretender, over the royal troops in 1746. The Carron Ironworks near are the oldest in Scotland.

Sheriffmuir, in Perthshire, where the Earl of Mar, who had risen on behalf of James, the Old Pretender, was defeated in 1715.

Culloden, near Inverness. On Culloden Moor the Young Pretender was routed in 1746.

Dunbar, in Haddington. The English defeated the Scots here in 1296. Cromwell defeated the army of Charles II. in 1650.

Bannockburn, near Stirling. Robert Bruce defeated Edward II. in 1314.

Preston Pans (Haddington). Charles Edward defeated the royal forces in 1745.

POPULATION.—4,882,000 in 1921, being over 164 to a sq. mile. The population is very unevenly distributed, varying from 11 per sq. mile in Sutherland to nearly 1,200 per sq. mile in Edinburgh, Renfrew, and Lanark.

THE PEOPLE.—The inhabitants of Scotland are in two clearly-marked divisions: The **Highlanders**, who are of almost unmixed Celtic descent, and speak Gaelic; and the **Lowlanders**, who are a mixed race of nearly the same composition as the English.

EXAMINATION PAPERS

- A. 1. Describe the coast line of Scotland, and name the chief openings. How is the historical connection of Scotland with Norway and with Ireland shown by the names used?
2. What are Glenmore and Strathmore? Describe the mountain region between them.
3. Indicate by two lines the mineral-producing portions of Scotland, name the coal-fields, and state what other minerals are produced.
4. State position and give some account of Edinburgh, Dumfries, Scone, Stornoway, Stranraer, Falkirk, Iona, Rannoch Moor, Culloden, and Kintyre.
- B. 1. Describe the relief of that part of Scotland which has the general name of the Lowlands. Name the ranges and chief heights in the Southern Uplands.
2. Give a general account of the direction, velocity, and usefulness of the Scotch rivers, and describe the Tweed and Clyde, naming towns in their basins and industries carried on.

FIG. 154.—SCOTLAND: COUNTIES AND TOWNS.



Walker & Boutall sc.

3. Name five seaports, and state as far as possible the nature of the commerce connected with them.
4. Why is the eastern side of Scotland more suitable for the growth of grain crops than the western?
- C. 1. State the position of Ben Nevis, Ben Attow, Ben More, Cuchullin hills, Goat Fell, Hart Fell, Ben Cruachan, and Ochill Hills.
2. Name ten lakes in Scotland, and describe Loch Lomond.
3. Name the three chief canals in Scotland, and show their importance.
4. Where and what are Rothesay, Oban, Strone Ferry, Wick, Lerwick, Schiehallion, Rhinns of Galloway, Carse of Gowrie, Stonehaven, and Ailsa Crag?
- D. 1. Give a description of the Hebrides, showing the divisions and how separated, naming the islands and describing the surface.
2. Where are most of the Scotch manufacturing towns? Name the chief manufactures, and state the towns where carried on.
3. Describe the relief of Scotland, north of Glenmore.
4. Give an account of the religion and government of Scotland.

IRELAND

POSITION AND BOUNDARIES.—Ireland is an island lying to the west of Great Britain, from which it is separated by the **North Channel**, **Irish Sea**, and **St. George's Channel**. The **North Channel** between **Fair Head** and the **Mull of Kintyre** (Cantyre) is only 13 miles across, and between Donaghadee and Portpatrick its width is 22 miles. The **St. George's Channel**, between **Carnsore Point** and **St. David's Head** in Pembrokeshire, is 53 miles wide. On the north, south, and west, Ireland is bounded by the **Atlantic Ocean**.

SIZE.—Area, 32,500 sq. miles.

Greatest Length, 290 miles, from **Malin Head** in the N. to **Mizen Head** in the S.

Greatest Breadth, 175 miles from **Slyne Head** to **Howth Head**.

Least Breadth, 90 miles, between **Sligo** and **Dundalk**.

Mean Breadth, about 140 miles.

The coast line has a length of about 2,000 miles.

RELIEF.—The surface of Ireland is very different from that of Great Britain; for, while in Scotland the mountains fill almost the whole country, and in England are mostly in the north and west, with a central table-land, those of Ireland are generally in short ranges and groups around the coasts.

As in Great Britain, however, the highest land is nearer the west than the east. The interior forms an extensive plain (half of which is under 250 feet above the sea), filling up nearly the whole of the central portion of the island from the **Knockmealdown Mountains** in the south to the hills of **Londonderry**

in the north, and from the **Wicklow Mountains** in the east to the **Connemara Mountains** in the west. The only high land of importance in this great stretch of country is the **Slieve Bloom Range**, which lies in the southern portion between **King's** and **Queen's Counties**.

This **Central Plain** is generally of a boggy character, the chief bog being the **Bog of Allen** in **King's** and **Kildare Counties**, with numerous lakes which receive the drainage of the landward slopes of the bordering mountain ranges. The bogs supply an abundance of **peat**, which partly compensates for the scarcity of coal, being the only fuel used by large masses of the people. A gradual reclamation of the bogs is going on; for, as the peat is removed from the surface, much of the underlying soil is found capable of cultivation, and drainage is also effective in converting boggy soil into good pasture land. The greatest elevation of the Central Plain is 300 ft., and the average elevation 200 ft.

COMPARISON WITH GREAT BRITAIN.—In England the lowlands are mainly in the east. The English **Fens** are very low-lying, and thus different from the Irish bogs, which vary in elevation from 100 ft. to 2,000 ft., and are therefore easily capable of drainage. The Central Plain of England, on the other hand, is at a higher elevation than that of Ireland, and the average elevation of the surface of England is 600 ft. compared with 400 ft. in Ireland.

The mountain ranges nearly all stretch from north-east to south-west as in Scotland and in North Wales; but those in the south-west of Ireland resemble the mountains of South Wales in stretching from east to west.

MOUNTAINS AND HEIGHTS.—1. In **Munster**.—**Mountains of Kerry**. These consist of a number of high ranges running mostly east and west, filling the great promontories of South-West Ireland, and extending into **County Cork**.

The highest peak is **Carntual**, 3,400 ft., in the group called **Macgillicuddy's Reeks**.

Other lofty peaks are **Brandon**, **Mangerton**, and **The Paps**. To the eastward this mountain system is continued by the **Galtee Mountains** and **Knockmealdown Mountains**.

2. In **Leinster**.—**Wicklow Mountains**. These mountains fill the county of Wicklow and are very picturesque. The highest peak is **Lugnaquilla**, 3,000 ft., and the most familiar is **Sugar Loaf**, 1,651 ft., a very conspicuous object as seen from the sea. An inland range is the **Slieve Bloom**, between **King's** and **Queen's Counties**, with an elevation of less than 2,000 ft.

The only considerable stretch of coast country unoccupied by mountains is in Leinster, from the **Wicklow Mountains** northwards to the **Mourne Mountains**.

3. In **Ulster**.—**Mourne Mountains**, a short range in **County Down**, rising to a height of over 2,000 ft., the highest point,

Slieve Donard, being nearly 2,800 ft. Antrim Mountains are a mass of elevated land with a steep descent towards the sea. The

FIG. 135.—IRELAND: RELIEF.



greatest elevation is **Trostan**, 1,800 ft. **Donegal Mountains** consist of a number of parallel ranges occupying the county of Donegal, and rising to nearly 2,500 ft. in **Mount Errigal**.

4. In **Connaught**.—**Mountains of Mayo**. These comprise a number of scattered peaks and groups to the north and south of **Clew Bay**. To the north are **Nephin Beg Mountains** and **Mount Nephin**. To the south are **Croagh Patrick**, 2,500 ft., a conspicuous and beautiful peak near the shore of the bay, and **Mweelrea**, 2,680 ft., at the mouth of **Killary Bay**, its base being washed by the ocean.

Connemara Mountains, known as the **Twelve Pins**, on the west of **Galway**, a collection of wild peaks averaging about 2,000 ft.

LAKES.—The dampness of the climate, combined with the nature of the surface, causes the Great Central Plain to be studded with numerous lakes of large size; and many others occur in the mountainous regions. The total area of the Irish lakes is 711 sq. miles.

Lough Neagh, 153 sq. miles, in the east of **Ulster**, is the largest lake in the British Isles. It is from 20 to 40 feet in depth.

Loughs Erne consist of **Upper** and **Lower Erne** connected by **River Erne**, which empties into Donegal Bay. On the river between the lakes stands the town of **Enniskillen**, famous in history for the resistance offered to James II. by its inhabitants on behalf of William III. and Mary II.

Loughs Corrib and Mask in Connaught. **Mask** communicates with **Corrib** by a remarkable subterranean channel. The lakes drain into Galway Bay by the River Corrib, which passes through the city of Galway and supplies water power to numerous flour mills.

Lakes of Killarney lie amongst the Macgillicuddy's Reeks, and consist of the Upper, Middle, and Lower lakes. These lakes are remarkable for the beauty of their surroundings and for the mildness of the climate in the surrounding district.

Loughs Allen, Ree, and Derg, are expansions of the River **Shannon**. **Lough Gill** is a pretty mountain lake near Sligo. **Lough Conn** is a large lake in Mayo.

COAST LINE.—The coast of Ireland is very irregular and rugged, the west being more indented than the east, and from the same causes which have produced the irregularity of the west coast of Great Britain.

The most remarkable part of the coast is that of **Antrim**, where the surface at a comparatively recent geological period was overflowed with lava. This, solidifying, has formed in regular columns, generally six-sided, of basalt, of which the wonderful natural phenomenon, the **Giant's Causeway**, is composed. The opposite coast of Scotland has similar rocks in Fingal's Cave in the Isle of Staffa. The west coast is generally very high, rising in places into cliffs of very great height, especially on the seaward side of **Achill Island**.

FIG. 136.—IRELAND: PHYSICAL AND POLITICAL.



The south-west has some noble estuaries separated by mountainous promontories.

The south coast is broken by numerous openings which form excellent harbours. The east coast is generally sandy and flat, and the harbours are, therefore, not so well naturally adapted for shipping, but the necessities of commerce have led to the construction of artificial harbours.

CAPES.—On the North.—Fair, Bengore, and Malin Heads.

On the West.—Rossan, Erris, Achill, Slyne, Loop, Kerry, and Dunmore Heads.

On the South.—Mizen Head, Cape Clear, Old Head of Kinsale, and Carnsore Point.

On the East.—Wicklow and Howth Heads.

OPENINGS.—On the North.—Loughs Swilly and Foyle.

On the West.—Donegal, Sligo, Killala, Clew, and Galway Bays, Estuary of Shannon, Tralee Bay, Dingle Bay, Kenmare River, Ballinskelligs and Bantry Bays.

On the South.—Kinsale, Cork, Youghal, and Waterford Harbours.

On the East.—Belfast, Strangford, and Carlingford Loughs Dundrum, Dundalk, and Dublin Bays, and Wexford Harbour.

ISLANDS.—These are generally small and lie near the coasts, mostly on the west.

On the North.—Rathlin Island, 7 miles by $\frac{3}{4}$ mile, is formed of basaltic rocks of the same formation as the adjoining coast.

Tory Island, off the Donegal coast, is washed by very stormy seas, which often render communication with the mainland difficult.

On the West.—Arran, the largest of many islands fringing the Donegal coast.

Achill, 95 sq. miles in extent, the largest Irish island, lies near the coast of Mayo. It is well known for the extremely high cliffs on the Atlantic side, and for the great poverty of its numerous inhabitants.

Clare is a mountainous island at the entrance of Clew Bay. This bay is remarkable for the vast number of small islands which occupy the eastern portion. A little to the south of Clare are Inishboffin and Inishturk.

Arran Islands, a group of three granite islands lying across the entrance of Galway Bay. The inhabitants wring a subsistence from the scanty soil and from the waters of the surrounding seas. Of late years the fishing industry has been fostered and encouraged, to the advantage of the natives.

The Blaskets and Valentia, 40 sq. miles, lie off the Kerry coast. The latter is the starting point of the submarine cable to Newfoundland, and is a very fertile island.

On the South.—Clear Island, 8 sq. miles, the most southerly point of Ireland, is high and barren.

On the East.—Here the islands are mere islets, the most familiar being Ireland's Eye, Dalkey, and Lambay.

CLIMATE AND RAINFALL.—The climate is generally milder and moister than that of Great Britain, being even more

FIG. 138.—IRELAND: JULY ISOTHERMS.

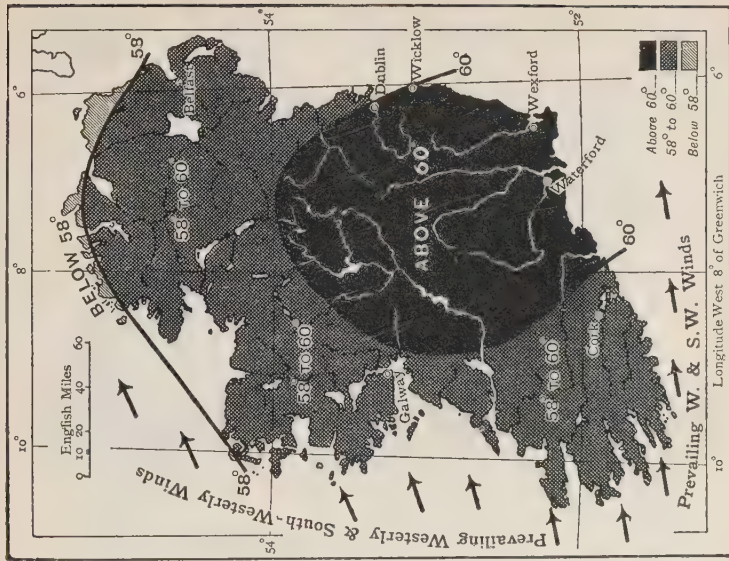


FIG. 137.—IRELAND: JANUARY ISOTHERMS.

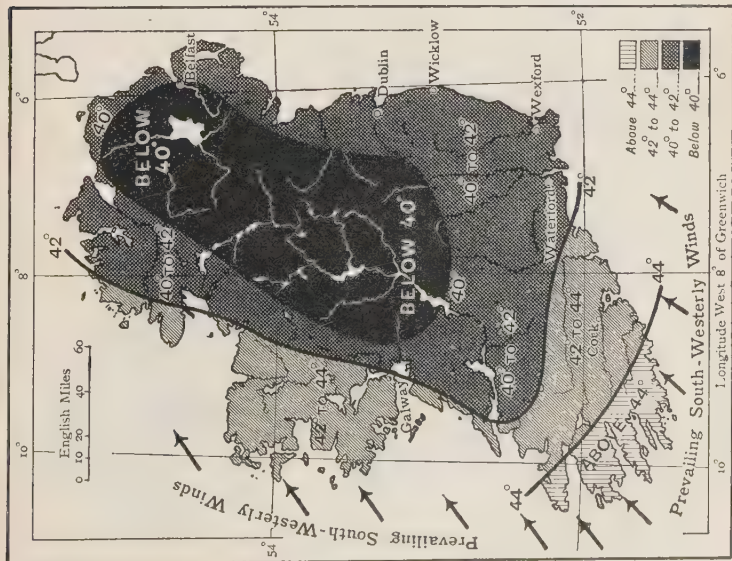
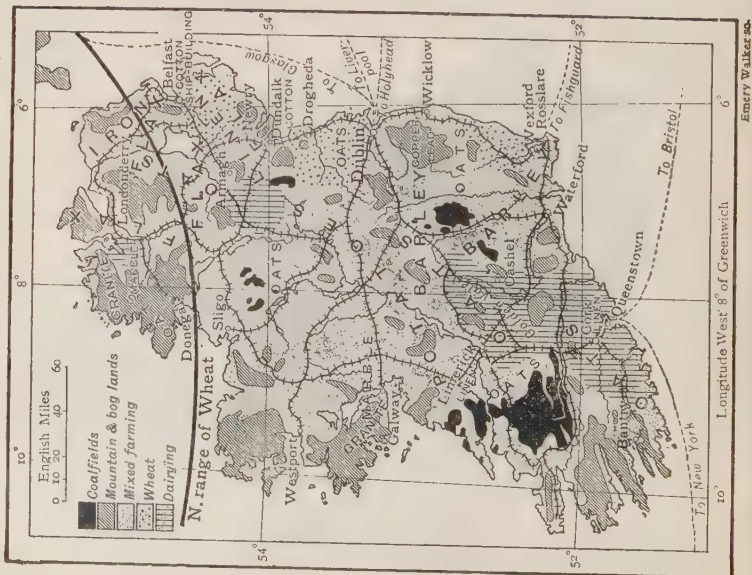
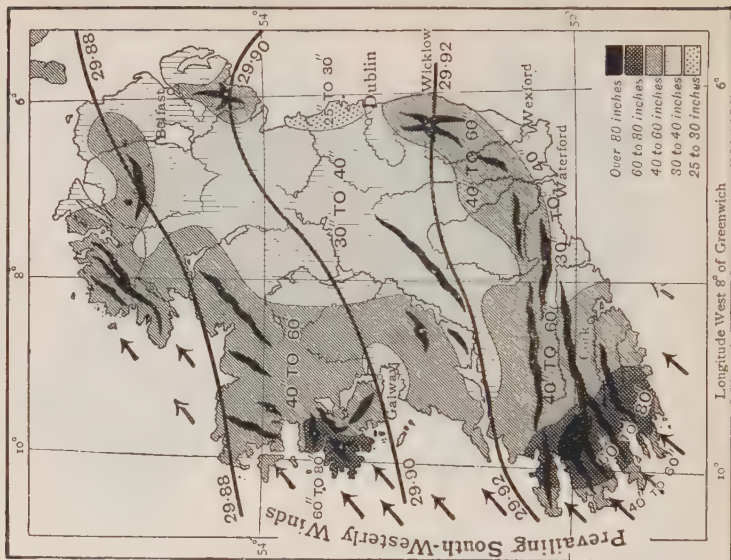


FIG. 139.—IRELAND: MINERALS, MANUFACTURES & RAILWAYS.



Emery Walker sc.

FIG. 140.—IRELAND: RAINFALL &c.



Emery Walker sc.

affected by the westerly winds and the Gulf Stream. The country is also further removed from the influence of the cold east winds. Hence the extremes of heat and cold are not so great as in Great Britain. The rainfall is not only more abundant, but also more equally distributed; and this, combined with the average higher temperature, produces the constant verdure which has gained for Ireland its names of **Green** and **Emerald Isle**.

LOCAL CAUSES WHICH MODIFY THE CLIMATE OF IRELAND:—

1. The winds for three-fourths of the year are from south to westerly; and are, therefore, moisture-laden and comparatively mild from their contact with the ocean, especially with the Gulf Stream, which sweeps past the western coast. This is clearly shown by the fact that the west coast lies between the winter isotherms of 44° and 42° (see map on p. 211).

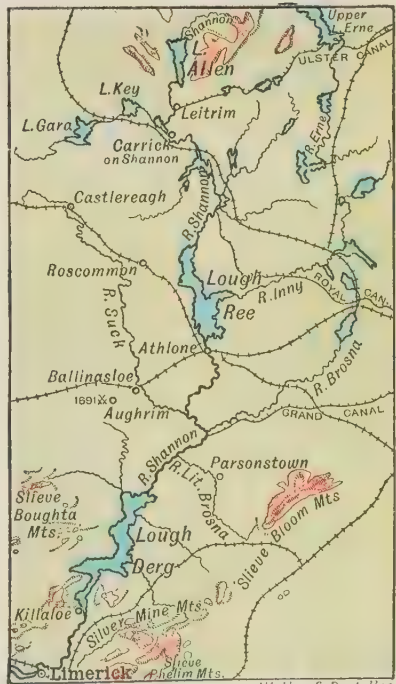
2. The cold east winds of spring are not so keenly felt as in Great Britain.

3. The mountains are not of sufficient height to cause complete condensation of the rain clouds in restricted areas, and hence the rainfall is general.

RIVERS.—Ireland is an extremely well-watered country, and its rivers are mostly navigable for considerable distances from their mouths.

The **Shannon**, the longest and most important river, rises in **County Cavan** and flows in a southerly and then south-westerly direction to the Atlantic Ocean. In its course it expands into three large lakes, **Allen**, **Ree**, and **Derg**, and its mouth forms an estuary 60 miles long. The natural obstacles to navigation have been avoided by the construction of canals, and the river now affords a waterway from **Limerick** to **Lough Allen**, a distance of 213 miles. The total length from the source to Limerick is about 214 miles, and this, with the addition of its fine estuary, makes the Shannon the longest river in the British Isles. The chief tributaries are the **Suck** on the right and the **Brosna** on the left bank.

FIG. 141.—THE RIVER SHANNON.



Green, up to 1,000 ft. ; brown, above 1,000 ft.

Other rivers are : 1. In the **South-West**.—The **Bandon**, **Lee** (60 miles), and **Blackwater** (90 miles), all rising in the **Kerry** Mountains and flowing east into **Kinsale**, **Cork**, and **Youghal** Harbours respectively. At the mouth of the **Lee** stands **Cork**, the third city of Ireland.

2. In the **South-East**.—The **Suir** (100 miles) and the **Nore**, rising in the **Slieve Bloom** Mountains, and the **Barrow** (114 miles), rising in the **Bog of Allen**, all unite in **Waterford** Harbour. The **Slaney** (70 miles) rises in the **Wicklow** Mountains and enters **Wexford** Harbour.

3. In the **East**.—The **Liffey** (75 miles) rises in the **Wicklow** Mountains and flows by a circuitous course into **Dublin** Bay.

The **Boyne** (80 miles) rises in the **Bog of Allen** and enters the sea between **Dublin** and **Dundalk** Bays. It is famous in history because of the great victory of **William III.** over **James II.** in 1690.

The **Lagan** (42 miles) rises in the **Mourne** Mountains and enters **Belfast** Lough.

4. In the **North**.—The **Bann** (100 miles) rises in the **Mourne** Mountains, and flowing into **Lough Neagh** issues from the northern end of the lake and enters the sea to the east of **Lough Foyle**. The **Foyle** drains a large part of **Ulster** and enters **Lough Foyle** at **Londonderry**.

5. In the **West**.—The **Erne** drains the lakes of the same name and flows into **Donegal** Bay. The **Moy** drains **Mayo** and **Sligo** and flows into **Killala** Bay, which is famous for the landing of the French to assist the Irish rebels in 1798.

FERTILITY OF THE SOIL.—The soil is generally fertile and capable of producing excellent green crops. Much of the surface is covered with bog, of which the red bog furnishes excellent peat, and the underlying surface can be tilled ; while the mountain bogs can be drained with comparative ease because of their elevation. The most fertile district in Ireland extends from **Cashel** to **Limerick**, and is known as the **Golden Vale**.

PRODUCTS.—**Agricultural**.—The humidity of the climate causes the pasture to be especially good ; and hence much of the surface is covered with grass, upon which are kept great numbers of **cattle**, producing excellent butter, and **sheep**. **Pigs** are also very numerous. The chief crops are **oats**, **potatoes**, and **hay**. **Wheat** and **barley** are grown to a small extent as compared with **Great Britain**. **Flax** is grown in the north-east.

Mineral.—Ireland is deficient in mineral wealth. It is believed that, at an early geological period, much of Ireland was covered with coal measures similar to those of **Great Britain**, but that they were worn away in the **Glacial Period**. A little coal of inferior quality is obtained in **Leinster** (**Kilkenny**, **Carlow**, and **Queen's County**). The chief fuel is peat, which is found abundantly in the bogs. In the peat beds the lower part is sometimes in the form of **lignite**. This is very abundant near **Lough Neagh**.

Iron-ore is fairly abundant, but is worked only in **Antrim**.

The scarcity of coal and iron is one of the chief causes of the backwardness of Irish manufacturing industries, which flourish only in **Belfast** and a few other northern towns.

Copper and Lead are worked to some small extent in **Wicklow**. **Granite** abounds in the mountainous districts generally, and excellent **marble** in **Donegal** and **Galway**. **Limestone** is also plentiful.

Small quantities of **antimony**, **manganese**, **fuller's earth**, and **slate** are also obtained.

Fisheries.—The value of fish landed in Ireland in 1921 was over 360,000l.

MANUFACTURES.—Irish manufactures are unimportant compared with those of Great Britain.

The chief are **linen** and **ship-building**. Others are **fabrics of mixed silk and worsted**, **lace**, **spirits**, and **tobacco**.

Linen is manufactured chiefly in **Ulster**, at **Belfast**, **Newry**, and **Armagh**; likewise at **Cork** and **Limerick**.

Ship-building.—This is centred at **Belfast**, which is famous for the construction of large vessels built of steel, and the great liners launched from its ship-yards may be seen in ports all over the world.

Mixed fabrics are made at **Dublin**. **Spirits**, chiefly **whiskey**, are largely distilled at **Dublin** and **Belfast**. **Flour** and **tobacco** are manufactured at **Limerick**. **Lace-making** occupies peasant women in **Donegal**. **Stout** is made at **Dublin**.

TRADE.—Ireland has but small direct foreign trade, no port having exports to the annual value of one million sterling. Even the manufactured goods from **Ulster** are largely distributed through **Liverpool** and **Glasgow**.

Exports.—Mainly agricultural and dairy produce: **cattle**, **sheep**, **pigs** and **bacon**, **eggs** and **butter**, with **linen** and **spirits**.

Imports.—**Manufactured goods** from Great Britain; colonial and foreign productions indirectly from Great Britain, and to some extent directly from the seat of production; **wheat** and **flour** from the United States; **coal** from Great Britain.

The chief importing seaports are **Dublin**, **Cork**, and **Belfast**.

MEANS OF INTERNAL COMMUNICATION.—The rivers are mostly navigable for some portion of their courses. The **Shannon** has been made navigable for 213 miles from **Limerick** to **L. Allen** by the construction of canals to avoid rapids and shallows.

Canals.—Two canals, the **Grand** (165 miles long) and the **Royal**, connect the **Shannon** with **Dublin**, the former passing across the Bog of Allen through **Tullamore**, and the latter to the northward by **Mullingar**. The **Grand Canal** has a branch extending to **Athy** on the **Barrow**, and thus **Dublin** is connected with **Waterford**.

The **Ulster Canal** joins the navigation of the **Shannon**, by way of **Loughs Erne** and **Neagh**, with **Belfast**. The total length of Irish canals is about 610 miles.

Railways.—In 1908 the total length of Irish railways open to traffic was 3,633 miles. Light railways have been constructed in the western mountain districts.

The roads in Ireland are generally excellent.

SEAPORTS.—These in order of population are **Dublin** (403), **Belfast** (385), **Cork** (76), **Limerick** (38), **Londonderry** (40), **Waterford** (27).

Others are **Dundalk**, **Greenore**, **Sligo**, **Kinsale**, **Wexford**, **Galway**, **Rosslare**.

Dublin (403 in the metropolitan police area), the capital and the largest city in Ireland, is situated at the mouth of the **Liffey**, which flows through it. The city has some handsome streets and fine public buildings, which

FIG. 142.—ULSTER.



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Walker & Boutall sc.

form a great contrast with the dwellings of the poor. The harbour has been improved, but there is not sufficient depth of water for the largest vessels, which consequently resort to **Kingstown**, on the south side of the bay. The commerce is considerable, but the manufactures are now of small consequence.

Belfast (385), at the confluence of the **Lagan** with **Belfast Lough**, is the most prosperous and important manufacturing town in Ireland. The chief manufactures carried on are linen, cotton, ship-building, and spirits. This port has extensive trade with Great Britain and considerable direct foreign commerce. The public and business buildings, and also the numerous churches, reach a high standard of excellence.

Cork (76), at the mouth of the Lee, is the third seaport of Ireland, having an extensive export trade in agricultural produce to Great Britain. **Queens-town**, on an island in Cork Harbour, is the port of call for the Atlantic mail steamers from Liverpool, and also is much frequented by homeward-bound vessels for orders.

Waterford, Limerick, Greenore, Dundalk, Rosslare, are all connected in trade with British ports by regular lines of steamers.

FIG. 143.—LEINSTER.



Longmans & Co. London & New York.

POLITICAL DIVISIONS AND TOWNS.—1. **ULSTER** embraces nine counties: Armagh, Down, Antrim, Londonderry, Donegal, Tyrone, Fermanagh, Monaghan, and Cavan. This is the most prosperous and wealthy portion of Ireland. The inhabitants are largely of Scottish and English extraction, being descended from the settlers in the reign of James I. and during

the Commonwealth. The most populous counties are Antrim, Down, and Londonderry.

Belfast, the chief town. (*See Manufactures and Seaports.*)

Londonderry (40), situated where the river **Foyle** enters Lough Foyle. The town is memorable for its unsuccessful siege by the forces of James II. in 1689. Large ocean ships call at **Moville**, near the entrance of the lough.

Armagh (8), an ancient seat of learning, and now the ecclesiastical capital of Ireland, is an inland town with considerable manufacture of linen.

Larne and **Carrickfergus** are small ports on the north-east.

Lurgan and **Newry** are inland towns carrying on linen manufacture.

Enniskillen, on the river **Erne** between the lakes of Erne, is famous for its resistance to James II. in 1689.

2. **LEINSTER**.—Twelve counties: **Louth**, **Meath**, **Dublin**, **Wicklow**, and **Wexford**, on the coast; **Longford**, **Westmeath**, **King's County**, **Queen's County**, **Kilkenny**, **Carlow**, and **Kildare**, inland.

Leinster and **Ulster** contain three-fifths of the people of Ireland, the population being most dense in the counties touching the east coast.

Dublin, the capital of Ireland. (*See Ports.*)

Drogheda, **Wexford**, **Greenore**, **Dundalk**, and **Wicklow**, are all seaports on the Irish Sea with cross-Channel and coasting trade; but none of them are of much importance. Near Drogheda was fought the famous **Battle** of the **Boyne** in 1690.

Bray is a much-frequented watering-place some few miles to the south of Kingstown. **Glendalough**, on the Wicklow Mountains, is famous for its natural beauties and the remains of ancient churches.

Most of the inland towns have cattle markets and are centres for the collection of agricultural produce, but are generally ill-built and devoid of industries. Of these towns **Kilkenny** is the most considerable.

Maynooth, some miles to the west of Dublin, is the seat of an important college for the training of Roman Catholic priests.

3. **MUNSTER***.—Six counties: **Clare**, **Limerick**, **Waterford**, **Cork**, **Kerry**, and **Tipperary**, the last-named being entirely inland.

Cork (76), the largest city in **Munster**. (*See Ports.*)

Limerick (38), the fourth city of Ireland, situated at the head of the estuary of the **Shannon**, is very ancient, and played an important part in the struggle between William III. and the supporters of James II. It was here that the army of James made its last stand and capitulated in 1691. The city now has considerable manufacture of linen and tobacco, and has a busy traffic both seaward and by the river Shannon.

Waterford (27), on the **Suir**, is the point for the collection and export of the produce of a large agricultural and grazing district.

Kinsale has an important fishing industry, especially of mackerel, and is a watering-place. James II. landed here from France in 1689.

Youghal has salmon fisheries.

Tipperary, **Mallow**, and **Clonmel**, are inland towns without any important industries.

Tralee, in the west of **Kerry**, is the largest coast town between Cork and Limerick.

* For map, see p. 220.

Killarney, beautifully situated near the lakes of that name, is the resort of many tourists.

Ennis is the capital and the only town of any importance in **County Clare**.

Cashel, in **Tipperary**, was the home of the kings of Munster in ancient times, and is famous for its interesting remains.

4. **CONNAUGHT***.—Five counties: **Galway**, **Mayo**, **Leitrim**, and **Sligo**, on the coast; **Roscommon** inland.

Galway (13), on **Galway Bay** at the mouth of the river **Corrib**, the largest city in **Connaught**, formerly carried on a large trade, especially with **Spain**, but is now much decayed. It was also the centre of a great milling industry, the power being supplied by the **Corrib**, which makes a fall at this point. Numerous large buildings still indicate the wealth and importance once enjoyed by the merchants of **Galway**. The city is still an important ecclesiastical, educational, and political centre.

Sligo is a somewhat thriving town with some trade.

Westport, at the head of **Clew Bay**, has some large warehouses, but very little trade.

Ballina, on the **Moy**, which flows into **Killala Bay**, has rather important salmon fisheries.

Tuam, in **Galway**, is the seat of a Roman Catholic archbishopric.

Carrick-on-Shannon, **Roscommon**, and **Castlebar** are inland towns of small importance except to their immediate neighbourhoods.

POPULATION.—4,496,000 in 1921. These figures are an estimate, as there was no census taken in Ireland in 1921.

The population is, as a rule, distributed somewhat evenly throughout the country in small holdings villages, and small towns, being most sparse in **Wicklow**, **Kerry**, **Galway**, **Meath**, **Westmeath**, and **King's County**, the most mountainous or boggy counties. The densest population is in the counties of **Dublin** (1,263 to the sq. mile), **Antrim** (372), **Lough**, **Armagh**, and **Down** (over 200).

THE PEOPLE.—In **Connaught** and **Munster** the people are almost solely Celtic, of Erse descent. In **Leinster** the Celtic is mixed with English blood, and in **Ulster** there is a very large Scotch and English element.

COUNTIES OF IRELAND, WITH THEIR CAPITALS

<i>Province</i>	<i>County</i>	<i>Capital</i>	<i>Situation</i>
Ulster	Antrim	Belfast	R. Lagan
	Down	Downpatrick	—
	Londonderry	Londonderry	R. Foyle
	Tyrone	Omagh	R. Camowen (trib. of Foyle)

* For map, see p. 221.

Leinster	Donegal	Lifford	R. Foyle
	Fermanagh	Enniskillen	R. Erne
	Cavan	Cavan	—
	Monaghan	Monaghan	—
	Armagh	Armagh	R. Callan
	Meath	Trim	R. Boyne (near to)
	Longford	Longford	—
	West Meath	Mullingar	R. Brosna

FIG. 144.—MUNSTER.



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Leinster	Dublin	Dublin	R. Liffey
	Wicklow	Wicklow	Wicklow Bay
	Kildare	Naas	—
	King's Co.	Tullamore	Trib. of Brosna
	Queen's Co.	Maryborough	—
	Kilkenny	Kilkenny	R. Nore
	Carlow	Carlow	R. Barrow
	Wexford	Wexford	Wexford Harbour
	Louth	Dundalk	Dundalk Bay

Connaught	Leitrim	Carrick-on-Shannon	R. Shannon
	Roscommon	Roscommon	—
	Sligo	Sligo	Sligo Bay
	Mayo	Castlebar	R. Clydagh
	Galway	Galway	Galway Bay (mouth of R. Corrib)
Munster	Waterford	Waterford	R. Suir
	Cork	Cork	R. Lee
	Kerry	Tralee	Tralee Bay
	Tipperary	Clonmell	R. Suir
	Limerick	Limerick	R. Shannon
	Clare	Ennis	R. Fergus

FIG. 145.—CONNAUGHT.



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EXAMINATION PAPERS

- A. 1. Describe the relief of Ireland, showing how it differs from that of Scotland.
2. Name the counties of Ulster, and give reasons for the comparative density of the population in certain counties of that province.

3. What are the chief agricultural, mineral, and animal products of Leinster?
4. Name seven seaports, and describe the three chief.
- B. 1. Describe the river system of Ireland; name as many rivers as possible in their order of importance, and give an account of the Shannon, with a sketch-map.
2. Name the chief mountain ranges, with some of the principal heights.
3. What manufactures are carried on in Ireland? Indicate the chief localities, and account for the comparative insignificance of Irish manufactures.
4. Compare the winter climate of the west of Ireland with that of the east of England.
- C. 1. Describe the Central Plain.
2. Name the islands on the coasts of Ireland, and describe Achill.
3. Account for the presence of so many lakes. Name five of them, and give a description of the largest and also of the most picturesque.
4. Where and what are the following:—Giant's Causeway, Arran, Valentia, Glendalough, Cashel, Kinsale, Corrib, Nephin Beg, Kingstown?
- D. 1. Describe the coast-line of Ireland, showing its resemblance to any neighbouring coasts, and comparing the west with the east.
2. What are the physical causes of Ireland being so largely a dairying country.
3. Give an account of the climate of Ireland, and show what physical conditions cause variations in different parts of the country.
4. Describe the system of internal communication in Ireland, naming the chief navigable rivers, and indicating the routes of the most important canals.

FRANCE

POSITION AND BOUNDARIES.—France lies to the south of England, from which it is separated by the English Channel and Strait of Dover.

It is bounded on the **west** by the **Bay of Biscay**; on the **south** by the **Pyrenees**, a lofty mountain range between France and Spain, and by the **Mediterranean Sea**; on the **east** by the **Alps** (between France and Italy), the **Jura Mountains** (between France and Switzerland), and an **artificial boundary** protected by many fortresses between France and Germany.

Being bounded by the sea on the north and west, by high mountains and the sea on the south, and by mountains on the greater part of its eastern frontier, France is most favourably situated for being the home of one nation.

SIZE.—Area 212,000 sq. miles; about $1\frac{7}{10}$ the size of the United Kingdom. The Treaty of Versailles (1919) restored Alsace-Lorraine, thus adding about 6,000 sq. miles. **Greatest Length.**—680 miles. **Greatest Breadth.**—585 miles.

RELIEF.—The surface of France slopes away from the east towards the sea, which washes its coast in the west and north. In the south-east are the great mountain systems of the **Alps** and **Jura**, separated by the deep valley of the Rhone from the **Central Plateau**. This plateau has a general height of more than 3,000 ft., and is, therefore, higher than most of the summits in England. Its **general slope** is towards the west and north-west, where it descends in terraces which gradually merge into the French lowlands. Its descent is very abrupt into the valley of the Rhone, from whence its south-eastern edge has the appearance of a lofty mountain range.

The **Western Highlands** that lie in Brittany and Normandy are under 1,000 ft. in average height, and resemble the highlands of Britain in this respect, that they consist of a succession of ridges running in all directions and opening into one another.

MOUNTAINS AND HEIGHTS.—1. The **Alps** in the south-east, separating France from Italy; with **Mont Blanc**, 15,700 ft. (nearly three miles).

By means of the **Mont Cenis Tunnel** through the Alps there is direct railway communication between France and Italy.

2. The **Jura Mountains** between France and Switzerland.

3. The **Cevennes**, which form the south-eastern edge of the Central Plateau; the highest peaks are nearly 6,000 ft.

4. The **Auvergne Mountains**, that cross the Central Plateau from north to south across nearly the middle.

This is one of the wildest parts of France. Many of the mountains are craters of extinct volcanoes (**Puys**). The loftiest are **Mont Dore**, 6,200 ft., **Plomb du Cantal**, 6,100 ft., and **Puy de Dôme**, 4,800 ft.

5. The **Pyrenees**, the northern slopes of which lie in France, but the highest mountain peaks are in Spain. Some of these reach a height of 11,000 ft.

These mountains form an effective barrier between France and Spain, and the chief roads as well as the railways pass round the extremities of the range.

PLAINS.—The greater part of France consists of lands lying below an elevation of 1,000 ft. These **lowlands** slope away to the west and north-west, and are crossed by many rivers. The chief plains are :—

1. The **Northern Plain**, lying near to England and Belgium.

2. The **Lowlands of the Loire Basin**.

3. The **South western Plain**, which lies between the **Auvergne Mountains** and the Bay of Biscay.

4. The **Valley of the Saône and Rhone**.

Comparison.—Generally speaking, we may say that the surface of France resembles that of Great Britain in being mainly highland in one part and mainly undulating lowlands in another, with but small areas of level plains. In Great Britain the **greatest heights** are in the north and west, with the **lowlands** stretching away to the south and east; whereas in France the **highlands** are in the south-east and the **lowlands** slope towards the north and west. In fact, the parts of the two countries that approach each other form part of the same plain, which has been cut into two parts by the English Channel and Strait of Dover. Further, the highlands of France reach a much greater elevation than those of Great Britain, the average height of its Central Plateau being about the same as that of the highest summits in England.

COAST LINE.—The south coast, which is washed by the Mediterranean, is steep, and forms bold cliffs in the east, where the 100-fathom line closely approaches the shore. But in the west the coast is low and flat, and the 100-fathom line is much farther out at sea.

Strong currents have deposited great quantities of sediment, forming in places low flat islands which line the shore.

The west coast, from the mouth of the Loire southwards, is also low, flat, and sandy.

Here also strong currents have deposited immense quantities of sand, which has been built by the tides and winds into a long line of **sand dunes**. Behind the dunes there are many small lakes, called *étangs*. The sand has also drifted inland and covered parts of the flat country immediately behind. (The Landes.)

The north-west coast is higher, forming steep granite cliffs, with many indentations in Brittany.

The north coast is varied in Normandy, and as far east as the mouth of the Seine, after which it forms a wall of chalk cliffs similar in character to those upon the opposite shores of England.

CAPIES.—**C. Gris-Nez**, opposite to Dungeness. **C. de la Hague**, the northern point of Normandy. **C. Ushant**, on a small island in the N.W. corner of Brittany.

SEAS, &c.—The North Sea, Strait of Dover, and English Channel in the north. The Bay of Biscay in the west. The Mediterranean Sea with Gulf of Lions in the south.

ISLANDS.—The Channel Islands, which belong to England. The chief are Guernsey and Jersey. Many low sandy islands lie near the coast in the Bay of Biscay, such as **Rhé** and **Oléron**. **Hyères Islands**, off the south coast. The large island of **Corsica**.

CLIMATE AND RAINFALL.—The climate of France is very similar to that of England, but it has **greater extremes of heat and cold**. There is a great difference between the east and the west. The west stretches out into the Atlantic, and is cooled in summer and warmed in winter by the winds from the ocean. The same latitudes in the east are much drier, and are hotter in

summer and colder in winter. On the whole, France has fewer rainy days and less fog and mist than England.

FIG. 146.—FRANCE.



The local causes which modify the climate of France are:—1. The Pyrenees and the Mediterranean moderate the hot winds which blow from Spain and Africa.

2. The winds from the Atlantic bring moisture and cool the land, while the Western Highlands are of sufficient elevation to condense the moisture and cause rain.

3. The land is low in the north-east, and there is no barrier to stop the cold winds which blow in winter over the great Northern Plain of Europe.

4. The Central Plateau protects the lowlands of the west from the cold winds which blow from the Alps.

NOTE.—The climate of France should be studied by references to the Isotherm maps of Europe on pp. 94 and 95.

In Brittany the winters are so mild that such plants as the camellia, which can be grown only under glass in England, blooms freely in the open air. But the summers are so damp and cold that wheat does not ripen well. In the same latitude in the east of France the summers are so warm and dry that grapes ripen freely, but the winters are so cold that even the holly and gorse are sometimes killed. A few sheltered places upon the shores of the Mediterranean enjoy a warm climate even in winter, and some of the towns are much resorted to by visitors from England. But, even in this part of France, towns situated in the open country are visited by a cold wind, the **Mistral**, which sweeps from the bleak Central Plateau or from the icy regions of the Alps.

RIVERS.—France is a **well-watered** country. As the highlands lie in the south-east and the general slope of the land is towards the north and west, it follows that most of the rivers must flow in a similar direction. Further, as the highlands lie so far from the sea, there is room for the rivers to develop into considerable streams and flow gently across the lowland plains. Hence the rivers are of great service for inland commerce. Altogether France has about **a hundred navigable rivers**, nearly all of which have their sources within the country. The chief rivers are:—

1. **The Seine** (430 miles) rises in the plateau of Langres, and after a winding course flows into the English Channel. Its chief tributaries are the **Aube**, **Marne**, **Oise** on the **right bank**, and the **Yonne** on the **left**. It drains an agricultural and manufacturing district, and has many towns upon its banks, such as **PARIS** (the capital), **Rouen** (a manufacturing town), and **Havre** (a great seaport). The main stream, as well as its two great tributaries, is navigable far into the interior, and by means of the **Burgundy Canal** the Yonne is connected with another great water-way afforded by the rivers **Saône** and **Rhone**.

2. **The Loire** (570 miles) rises in the Cevennes upon the south-eastern side of the Central Plateau, and discharges its waters into the Bay of Biscay. Not far from the source of the Loire there rises its great tributary, the **Allier**, which also crosses the eastern side of the Central Plateau, and then opens into a broad upland plain, the **Limagne**, one of the most fertile and best-cultivated districts in France. Its chief tributaries are the **Sarthe** and **Mayenne** on the right bank, and the **Allier**, **Cher**, and **Vienne** upon the left.

The Loire is navigable for 500 miles. It drains a great agricultural district, and has many towns of historic importance upon its banks, such as **Orleans** and **Tours**, and two good seaports, **Nantes** and **St. Nazaire**. By means of one canal it is connected with the Seine, and by another, the **Canal du Centre**, with the Rhone.

3. **The Rhone** (490 miles) rises in the Alps in Switzerland, and, after flowing through Lake Geneva, it enters France, keeping for some distance in a westerly direction. At its junction with the **Saône** it bends sharply to the south, and continues in this direction until it reaches the Mediterranean. Rising, as it does, in lofty mountains, flowing along a steep and narrow valley, and well supplied with water from the glaciers and mountain torrents of the Alps, its course is very rapid, and so much *débris* is brought down that a delta has been formed. Though navigable as far as Lyons, it is very difficult for ships to ascend the stream. Its chief tributaries are the **Saône** (which receives the waters of the **Doubs**), on its right bank, and the **Isère** and **Durance** on the left. By means of canals it is connected with the basins of the Seine, the Loire, and the Rhine.

4. The **Garonne** and **Dordogne**, which drain the south-west part of France, and, uniting, form the **R. Gironde**. The Garonne rises in the Pyrenees, whereas the Dordogne rises far away in the Auvergne Mountains. **Bordeaux**, an important seaport, stands near the junction of the two rivers.

5. The chief of the smaller rivers are the **R. Somme**, which drains part of the north-eastern corner; the **R. Vilaine**, which drains a large part of Brittany and enters the Bay of Biscay, a few miles to the north of the mouth of the Loire; the **R. Charente**, which drains the country between the basins of the Dordogne and the Vienne; the **Adour**, in the extreme south-western corner.

FERTILITY OF SOIL.—Less than one-fifth of France is occupied by mountains; about one-fourth by plateaux. This leaves more than one-half for the lowlands, which contain a large proportion of fertile soil. This, combined with plenty of sunshine, an ample rainfall, and an abundance of rivers and streams, places France in the front rank of agricultural countries.

PRODUCTS.—Agricultural.—1. The **vine** is the most valuable of all French crops, and covers an area as large as that covered by wheat and barley together in the United Kingdom.

France is the **chief wine-producing country in the world**, both for quantity and quality. Its most celebrated wines are the **clarets** or **Bordeaux** wines from the best vineyards of the basin of the R. Gironde, and **champagne** made from the vines which grow upon the chalk hills of the old province of that name. About 1½ mills. of people are employed in the wine industry.

2. **Grain Crops.**—Of these, the **wheat** crop of France is next in amount to that of the United States, and is about four times that of the United Kingdom. **Barley** and **oats** are grown, and, in addition, large quantities of **maize**, **rye**, and **buckwheat**, which are not grown in the United Kingdom.

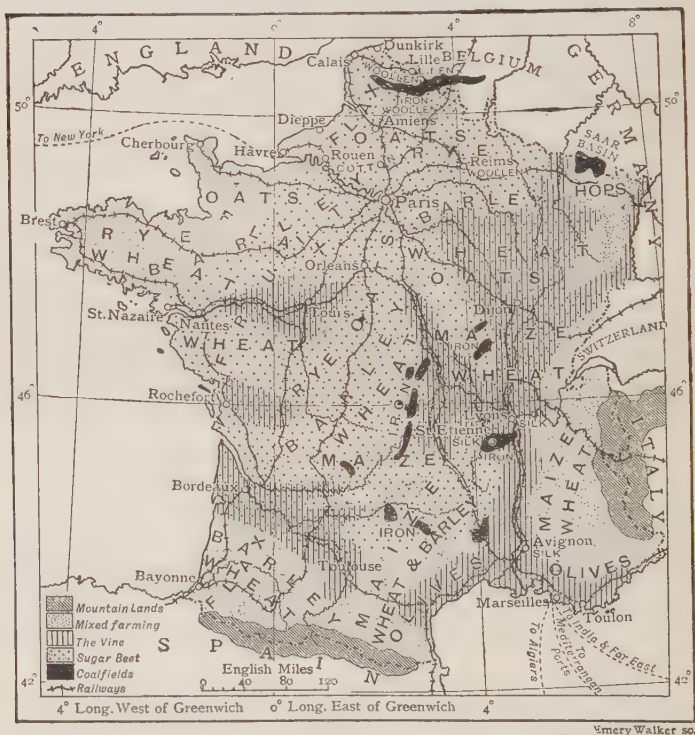
3. France also grows all the green crops that are raised in England, such as **hay**, **potatoes**, **turnips**, **mangolds**, &c.

4. Other crops are **sugar-beet**, **tobacco**, **hemp**, and **flax**. There are also large areas devoted to **olive-yards** and **mulberries**, the latter to furnish food for the silkworms.

On the whole, France is mainly an agricultural country, but French agriculture is inferior to British. If an acre of land under wheat were as productive in France as in England, then the total wheat crop of France would be six and one-third times, instead of being little more than three and a half times, that of the British Isles.

MINERAL.—The mineral wealth of France is relatively small, the most serious deficiency being in that most needed, viz., coal.

FIG. 147.—FRANCE: VEGETABLE AND MINERAL PRODUCTS, ETC.



Emery Walker sc.

There are three chief coal-fields, though there are many smaller ones scattered over different parts of the country. 1. The **Northern Coal-field**, which is an extension of the great Belgian coal-field into France, the chief centre of production being near **Valenciennes**. 2. The **Southern Coal-field**, upon the eastern border of the Central Plateau, the chief centres being near **St. Etienne** and **Creuzot**. 3. The **Saar Basin**, from Germany (1919).

Iron is found upon or near to the coal-fields, and **rock-salt** in several places.

Considerable quantities of coal are imported from England and Belgium.

MANUFACTURES.—The leading manufactures arranged in order of their values are:—1. **Woollen goods**; 2. **Silks**; 3. **Cotton goods**; 4. **Linens**; 5. **Machinery**. There are also many minor industries, such as **porcelain** and **earthenware**, **watches**, **refined oil**, **soap**, &c.

Generally speaking, French manufactured goods show greater artistic finish than English.

1. The **Woollen industry** is chiefly carried on in the north, where are the principal supplies of native wool, where supplies of foreign wool are easily obtained, and where there is plenty of coal and iron. The chief markets for wool in the order of their importance are **Roubaix**, **Tourcoing**, **Reims**, **Fourmies**, and **Amiens**.

Roubaix, **Tourcoing**, and **Fourmies** are all close to the northern coal-field, and are mostly supplied with wool by way of **Dunkirk**.

Reims lies beside the sheep-pastures of Champagne, a region similar to the English downs, and which has been the seat of a woollen industry from very early times.

Amiens receives its supplies of wool by way either of **Havre** or **Dunkirk**.

The towns of **Lille** and **Elbeuf** are also engaged in making various kinds of woollen goods.

2. **Silks**.—The silk manufactures still have their chief seats in the valley of the Rhone, where they first grew up in consequence of the introduction of the silkworm. The chief towns are **Lyons**, the second town in France in size, and **St. Etienne**, both of which are near the southern coal-field, and have excellent water for dyeing. **Avignon** and other towns in the Rhone Valley are also engaged in the silk industry.

3. The **Cotton industry** is carried on chiefly in the towns of Normandy. **Rouen**, on the Seine, is the centre of the industry; after Rouen comes **St. Quentin**, and there are several other small towns in the east.

4. **Linen** is made mostly at **Lille**, the largest manufacturing town of the north. That part of Belgium which lies nearest to France grows the best flax in Europe. To the south-west of Lille is **Cambrai**, which gives its name to *cambric*.

5. **Machinery, &c.**—**Creuzot** is the chief town engaged in the making of machinery, guns, locomotives, railway material, &c., but such industries are also carried on in **Paris**, at **Lille** and other towns.

TRADE.—France has considerable internal as well as foreign trade, but her exports are only about two-thirds those of the United Kingdom, while her imports are about half. Much of the French trade is done in English ships.

MEANS OF INTERNAL COMMUNICATION.—The rivers play a much more important part in the internal trade than they do in England. All the great rivers are navigable, some of them for many hundreds of miles. Further, all the great river-systems are united by a splendid system of canals, the chief of which are:

1. The **Canal du Centre**, which connects the rivers Loire and Rhone. The highest level of this canal is about 1,000 ft. above the sea.

Before railways were made this canal was the trade route for the exchange of the wine, cottons, and linens produced in the north for the silks, &c., of the south.

2. The **Canal du Midi**, which connects the river Garonne with the Mediterranean.

3. The **Burgundy Canal**, which joins the basins of the Seine and Rhone.

4. The **Rhine and Rhone Canal**, by means of which internal trade is carried on between France and Germany.

There are also other canals, many of which are the medium for much heavy traffic

Railways.—All the great French railways radiate from Paris like spokes from a hub. But, though railways cross the country in all directions, it is not intersected in the same way as England, and there are still considerable areas out of the reach of railways. There were 25,390 miles of railway in 1912. The chief lines are :—

1. The **Northern Railway** connects Paris with Amiens, Boulogne, and Calais (and so with England), and the mining and manufacturing towns near Lille and Valenciennes, and thence through Belgium with the great seaport of **Antwerp**.

2. The **Western Railway** connects Paris with the great manufacturing town of Rouen, with the port of Havre, with the naval ports of Cherbourg and Brest, and with the quaint old towns of Normandy and Brittany.

3. The **Paris and Orleans Railway** skirts the Loire to Orleans and Nantes, and by means of branch lines connects Paris with Bordeaux and with the canal systems that meet at Toulouse. Other branches pass east and west of the Pyrenees into Spain.

4. The **Paris, Lyons, and Mediterranean Railway** connects Paris with Lyons and Marseilles, and, by means of the Mont Cenis Tunnel, with the railway systems of Italy.

The chief centres of internal trade are **Toulouse**, which stands at the junction of the Canal du Midi with the Garonne; **Orleans** and **Tours**, on the Loire; **Dijon**, on the Burgundy Canal, and an important centre of the Burgundy wine trade; **Reims** and **Epernay**, centres of the trade in champagne wine.

FOREIGN TRADE.—Imports.—In recent years four articles—viz. wool, coal and coke, cereals, raw cotton—have made up together about 30 per cent. of the imports.

Among other leading imports have been timber and wood, hides and furs, oil-seeds, wine, machinery, petroleum, coffee, &c.

Exports.—Four articles have also made up about 30 per cent. of the value of the exports, viz. cotton, woollen and silk manufactures, wine, raw wool and yarn, raw silk and yarn.

Among other exports of importance are leather and leather wares, haberdashery, cheese and butter, skins and furs, motor cars.

The countries with which foreign trade is mostly carried on are the adjacent countries of Europe, viz. the **United Kingdom**, **Belgium**, **Germany**, **Spain**, **Italy**, the **United States**, the **Argentine** and **India**. The **United Kingdom** is first both in value of exports and imports. In fact, it takes about a fourth of all the French exports.

The trade of France comes third to that of the **United Kingdom** among the countries of Europe.

France obtains from the **United Kingdom** coal, wool, woollens, cottons; and sends silks, woollens, butter, wine, brandy, &c.

France obtains from **Belgium** wool, coal, flax, animals; and sends wool, woollens, and woollen yarn, wine.

France obtains from **Germany** animals, timber, cottons; and sends wine, cotton, hides and skins, fancy wares.

France obtains from the **United States** cotton, grain, fats, petroleum; and sends silks, woollens, articles in leather.

France obtains from **Italy** wine, raw and thrown silk, olive-oil; and sends silk and silk waste, woollens.

with United Kingdom £97 millions.

with U.S.A. £77 mills.

with Belgium £73 mills.

with Germany £36.

*Switzerland
£20 m.*

FIG. 148.
FRANCE: TRADE WITH
OTHER COUNTRIES,
1923.

SEAPORTS.—The principal, in the order of their importance, are:—**Marseilles** (580), **Havre** (163), **Bordeaux** (267), **Dunkirk** (38), **Rouen** (124), **St. Nazaire**, **Cette**, **Dieppe**, **Boulogne**, **Calais**. [Census 1921.]

Marseilles trades with the Mediterranean countries, and with the East, *via* the Suez Canal. Its great Steamship Company, the **Messageries Maritimes**, sends its ships to India, China, Australia, &c.

Havre, at the mouth of the Seine, is the chief seat of the trade with America.

Dunkirk is the only French port in the North Sea, and of recent years has been the most rapidly rising of all French seaports.

TOWNS AND DISTRICTS.—1. **The Northern Plains.**—This is a wide stretch of lowlands, containing an abundance of coal and iron and a fertile soil. It is drained and supplied with waterways by the Seine, Somme, and other rivers. It is near to England, and where it joins Belgium the boundary is low, and communication is therefore easy. The mouth of the Seine affords a good harbour, and here the port of Havre has sprung up. Hence this district is suitable for agriculture, manufactures, and trade, and is the most thickly peopled part of the country. Among the chief towns are:—

PARIS (2,900), which is the capital of France, and stands just below the junction of the Seine and Marne, in about the centre of Northern France. Originally built on a small island in the middle of the river (now the heart of the city), it at present occupies both banks, and, as regards population, is second to London among the cities of the world. Its exposed situation

renders defensive works necessary, and, besides being surmounted by a strong wall, it is protected by a ring of forts extending a considerable distance into the country round. Some of the best-known forts are those of **St. Denis, Montmartre, Ivry, Mt. Valérien**. Famous all over the western world as the centre of fashion and elegance, it is in France without a rival in influence, the focus of all the best intellect and energies in the country, and the originator of all the movements by which the destiny of the people is decided.

Some of the finest buildings are the **Cathedral of Notre Dame** and the **Louvre**, which contains the finest collection of pictures and statues in the world. W.S.W. of Paris is **Versailles**, formerly a favourite residence of the French kings. The Seine is crossed by many bridges, and is navigable for small vessels which trade between Paris, Rouen, and Havre.

Paris is associated with a large number of industries, such as jewellery, perfumery, furniture, porcelain, glove-making, fashionable boots and shoes, &c. The porcelain work, which gave name to Sèvres porcelain, is now carried on at St. Cloud, to the north of Sèvres.

Havre (163), at the mouth of the Seine, is the chief French seaport on the north coast, the starting point of the French telegraph cable to America, and the chief seat of trade with that Continent, whence it imports cotton, grain and other articles of food, and petroleum. It has considerable trade with England.

Rouen, the old capital of Normandy, higher up the Seine, can be reached by smaller sea-going ships, and hence is to some extent a seaport of Paris, while at the same time it, with neighbouring towns, is a great seat of cotton manufacture, and thus is for Havre on a small scale what Manchester is for Liverpool.

Calais, Boulogne, and Dieppe are chiefly important as starting points for people passing between France and England. They have only a coasting trade, as their harbours will not admit large ships.

Calais is interesting as being the last place held by the English on the mainland of France (lost in 1558).

Crecy (1346) and **Agincourt** (1415) are the sites of two famous battles which the English won over the French.

The seaport of **Dunkirk** and the towns of **Lille, Tourcoing, Roubaix, Fournies, Amiens, and Reims** have been mentioned when treating of manufactures.

2. Lowlands of the Loire Basin with Normandy and Brittany.—This is almost a purely agricultural district traversed by the R. Loire, and has neither mines nor manufactures. It is most thickly peopled near the north-west coast. None of the towns are large, but many of them are of great historic interest. The coast of Brittany abounds in fish, and the fishermen are the most skilful seamen in France.

Lorient and Brest are two naval ports—the Plymouth and Portsmouth of France.

Cherbourg, on the coast of Normandy, has been made into a strong naval port, but only after a great outlay of money.

Nantes and St. Nazaire are two ports upon the Loire. The former is some distance from the mouth of the river, and on account of the silting up of the bed of the river as well as the increased size of ships, has been superseded by St. Nazaire, which has sprung up at the mouth.

Angers, Tours, and Orleans are higher up the river. **Orleans** is the largest of the three, though it stands in a less fertile country. It owes its size to its position: (1) at the bend of the Loire, (2) at the point where the river is crossed by the great road from Paris to the south-west.

Poitiers, on the Vienne, a very old town, owes its importance to its position upon the same great road, and is of interest because of the victory won near it by the Black Prince (1356).

3. South-western France.—This comprises the greater part of the Garonne basin with those of the Adour and the Charente. The country near the coast to the south of the R. Gironde is the flattest part of France, as well as the least populous and the most unhealthy. But it has improved in many ways since it has been drained by a system of canals.

This part of France has no important manufacture. Most of the people are employed in agriculture, and some of the best wine is made in the valley of the Garonne.

Bordeaux (267) stands at the head of the estuary of the Gironde. It is the third seaport and has a large trade in exporting the clarets of **Medoc** and other wines grown in the surrounding country. Here also has arisen another seaport, **Pauillac**, lower down the river, for the accommodation of larger ships than can get up to Bordeaux.

Toulouse (175) owes its importance to its position at the confluence of the Garonne and the Canal du Midi.

4. Valley of the Saône and Rhone and Mediterranean Region.—This is one of the most thickly-populated parts of France. It contains an excellent coal-field, upon which stand such manufacturing towns as **St. Etienne** and **Creuzot**, and which affords supplies of coal and iron to **Lyons**, the centre of the world's silk industry. Wine is made in large quantities upon the sunny slopes of the Côte-d'Or, where that range looks down upon the sunny valley of the Doubs.

Marseilles (586), the ancient Massilia, a town which was founded by a Greek colony in the eighth century B.C. on a fine bay, and as near as possible to the delta of the Rhone, speedily developed into a great seaport on account of its situation at the end of the only convenient route connecting the north of Europe with the western half of the Mediterranean.

Its trade is chiefly with the Mediterranean and the East, and it is one of the ancient ports benefited by the opening of the Suez Canal. It is the head-quarters of the Messageries Maritimes, a line of steamships. Among its local industries are the refining of oil and the making of soap.

Lyons (561) is the third town in France in point of population, and is the centre of the world's silk industry. It stands at the confluence of the Rhone and Saône, and is the birthplace of Jacquard, who invented the loom which bears his name, and by means of which silk lace and velvet goods are woven into figured patterns.

St. Etienne (167) supplies Lyons with coal, and manufactures ribbons and other silk goods.

Toulon is a naval station with an almost impregnable fortress.

Cannes, Nice, and Mentone lie under shelter of spurs of the Alps, and are mild winter resorts.

Dijon is situated upon the Burgundy Canal, and is the centre of a great wine trade.

Strassburg and Metz restored to France (1919).

POPULATION.—About $39\frac{1}{4}$ millions (census 1921), or 184 to the sq. mile. (United Kingdom 373 to the sq. mile.)

The **density of population** is less in France than in the United Kingdom, but in France the population is more **evenly distributed**. The only districts where the population exceeds 500 to the sq. mile are:—(1) The manufacturing and mining district in the north-east corner. (2) The similar district around St. Etienne and Lyons. There are several large districts in England where the population exceeds 1,000 to the sq. mile.

The People.—The people of France are mainly of **Celtic origin**, but during four centuries of Roman domination were so completely Romanised that a Celtic dialect is now spoken only in a part of Brittany, and the Latin language, altered by degrees into the **modern French**, has spread over almost the entire country.

Political Divisions.—Before the Revolution the country was divided into **provinces**, and, though these are no longer recognised, some of their names are familiar as applied to well-marked districts, e.g. **Normandy, Brittany, Guienne, Gascony, &c.** Since the Revolution the country has been divided into **departments**, of which there are now **eighty-seven**.

After the Franco-German war of 1870-1 part of the boundary between France and Germany was moved to the west, and the province of **Alsace** and part of **Lorraine** were incorporated with Germany. The Peace Treaty restored these provinces to France (1919).

Corsica is an island in the Mediterranean separated from the neighbouring island of Sardinia by the Strait of Bonifacio. It is about as large as Yorkshire, and contains about 300,000 inhabitants. Most of the island is covered by lofty mountains, and the fertile lands lie near the coast. Wine is produced, and the fisheries are important. **Ajaccio**, the capital, was the birth-place of Napoleon Buonaparte.

Foreign Possessions.—These comprise an area of over $5\frac{1}{4}$ millions of sq. miles, with a population of over 53 millions

In **Asia**: Some small possessions in India, the chief of which is **Pondicherry**.

Annam, Cambodia, Cochin-China, Tongking.

In **Africa**: **Algeria, French Equatorial Africa, Tunis, Senegal, Guinea, Ivory Coast, Dahomey**, and the islands of **Madagascar** and **Réunion**.

In **America**: **French Guiana** and some small islands in the West Indies.

In **Oceania**: **New Caledonia, Tahiti**, and other islands.

EXAMINATION PAPERS

- A. 1. Give the boundaries of France, and show why, from a geographical point of view, it is suitable for the home of one nation.
 2. Describe the relief, and give the principal mountains. What influence has the position of the highlands upon the climate of the north-western lowlands?
 3. Describe the course of the R. Seine, and give a sketch-map.
 4. Name the chief rivers of France, showing where they rise, where they flow into the sea, and the largest towns upon them.
- B. 1. Compare the agricultural products of France with those of England, and explain why France is more of an agricultural country than England.
 2. Describe the chief coal-fields. What manufactures are carried on upon them?
 3. Which are the most thickly-peopled parts of France, and account for the density of population in those particular districts?
 4. What are the chief manufactures, and where are they carried on?
- C. 1. Show how the natural waterways of France are connected with the artificial ones.
 2. What are the principal imports and exports?
 3. What kinds of goods does France buy of England and sell her in exchange?
 4. What goods does France buy from Germany, Italy, and the United States?
- D. 1. Name four of the great seaports; say where they are situated, and the countries they trade with.
 2. Show how a bale of cotton might cross France by water from Havre to Toulouse.
 3. Say all you can about Paris.
 4. Where are Lille, Orleans, Brest, Marseilles, Tourcoing, Crecy, Mentone, and St. Etienne, and say what they are noted for?
- E. 1. Give a description of the Valley of the Rhone, and describe the towns and the industries carried on there.
 2. Say all you can about Lyons and Marseilles.
 3. Where and what are:—The Cevennes, Charente, Côte-d'Or, Mont Cenis, Toulon, Landes, Puys, Hyères, Mistral, Gironde, Mont Valérien, Versailles, Pondicherry?
 4. Show in what ways the climate of France is favourable to agriculture and the growth of industries.

BELGIUM AND HOLLAND

PHYSICAL

Correctly speaking, there is no kingdom of Holland, that name belonging to two provinces—North and South Holland, and the kingdom being that of The Netherlands (Fr. *Pays-Bas*,

or Low Countries); but the usual English custom will be followed in this chapter and the name Holland used for Netherlands.

POSITION AND BOUNDARIES.—Belgium and Holland fill up the angle between North-east France and Western Germany. They are bounded on the west and north by the North Sea, south-west by France, and east by Germany.

The land boundary is everywhere an arbitrary one, and is defended by fortresses on the French frontiers. To Holland was once attached the Grand Duchy of Luxembourg, to the south-east of Belgium, but by the operation of the Salic Law on the death of the King of the Netherlands in 1890, who was also Grand Duke of Luxembourg, the Grand Duchy became independent.

SIZE.—BELGIUM.—Area, 11,373 sq. miles. Length, 160 miles from east to west. Breadth, 115 miles.

HOLLAND.—Area, 18,624 sq. miles. Length, 164 miles from north to south. Greatest breadth, 144 miles.

RELIEF.—The whole of Holland and the western part of Belgium form part of the Great European Plain, and a large portion of the land bordering upon the ocean is below the sea level at high tide. No part of Holland reaches a height greater than 300 ft. above the sea.

In Belgium, the land gradually rises from north-west to south-east, where the hilly country called the **Forest of Ardennes** forms part of the Highlands of Central Europe, and has an average elevation of 1,000 ft. On both sides of the northern Belgian frontier, the district known as **Kempen Land**, or the Campine, is sandy and healthy, but parts have been made fertile by great industry.

PLAINS.—The **Great European Plain** extends throughout Holland and Northern Belgium. The tracts of low land which have been reclaimed from the sea are called **Polders**.

COAST LINE.—From the Helder southwards the coast is bordered by sand dunes, about 40 or 50 ft. high, which act as natural dykes in preventing the inroads of the sea. These dunes extend almost continuously from the north-east of France to Jutland. In parts of **Zeeland** and on the east coast of the **Zuyder Zee** the land is in places 40 ft. below sea-level and is protected by artificial dykes. The **Zuyder Zee** was formed in the thirteenth century by the sea bursting through the dunes and connecting a lake with the ocean. The chief islands extending across the mouth of the **Zuyder Zee** are **Texel**, **Vlieland**, **Terschelling**, and **Ameland**. Some of the other islands are **Walcheren**, **North and South Beveland**, **Schouwen**, and **Voorne**.

SEAS, &c.—**Dollart Zee** (formed in the twelfth century by an inroad of the sea), **Zuyder Zee**, and the many channels forming the mouths of the **Rhine**, **Maas**, and **Scheldt**.

CLIMATE AND RAINFALL.—The rainfall is abundant near the coast, but lessens towards the interior. The winter is very severe, especially in Holland, where the canals are generally frozen for three months. **Luxemburg** has abundant rain, being hilly and well wooded.

The local causes which modify the climate are—

1. The strong winds from the sea, which blow with great regularity and uniformity.

2. The cold east winds have free play over the flat surface. A reference to the Isotherm maps of Europe on pp. 94 & 95, will show that the Netherlands form part of the great European plain which has a winter temperature of from 0° to 32°, and as the prevailing winds in the winter are from the east the rivers and canals of Holland are frozen for many weeks.

3. The presence of numerous rivers, lakes, canals, and openings, which tend to make the climate moist.

RIVERS.—Belgium and Holland are well watered, possessing the lower courses of several large rivers—viz. **Rhine**, **Maas**, and **Scheldt**, all of whose mouths are in Holland.

The **Rhine** divides shortly after entering Holland into a right branch, the **Lower Rhine**, also called **Lek** near the mouth, and the **Waal** on the left. The **Waal** receives the **Maas**, and, joining the **Lek**, the stream so formed is called the **Maas** where it finally enters the sea. The **Lower Rhine** gives off the **Ijssel** and **Vecht** to the **Zuyder Zee** and the **Old Rhine** to the **North Sea**. The chief towns on the **Rhine** and its branches are **Arnhem**, **Zutphen**, **Nijmegen**, **Utrecht**, and **Rotterdam**. (A general description of the **Rhine** is given with **Germany**.)

The **Maas** (500 miles) rises in France in the Plateau of **Langres**, and is known there and in Belgium as the **Meuse**. In Belgium and Holland it is a deep and navigable stream. The chief tributary is the **Sambre** on the left. The valleys of this river and its affluents are rich in minerals, and are the home of many manufactures. The chief towns are **Charleroi**, **Namur**, **Liège**, and **Naastricht**.

The **Scheldt** (250 miles) rises in North-eastern France and drains the western half of Belgium. After a very winding course its waters reach the sea by many channels which form a large delta. It receives the **Dender** on the right and the **Lys** on the left. On the main stream stand **Ghent**, a very ancient manufacturing city, **Antwerp**, a flourishing seaport, and **Tournai**.

In the basin of the **Scheldt** are **Brussels**, **Louvain**, **Mons**, and **Malines** (**Mechlin**).

FERTILITY OF SOIL.—In Holland the soil is naturally very fertile, and produces rich pasture, upon which large numbers of cattle are reared for dairy produce. In Belgium a considerable portion of the soil, which was not naturally fertile, has been rendered very productive by the people. Less than one quarter of the surface is uncultivated. Where the two countries meet a large tract of sandy soil exists, and the population is scanty. Belgium is remarkable for the exceeding care and success with which the soil is cultivated.

PRODUCTS.—1. **Agricultural.**—In **HOLLAND** the land is largely under grass, and **cattle, butter and margarine, and cheese** are the most important products. The chief crops are **rye, oats, potatoes, flax, and bulbs.**

BELGIUM.—**Wheat** (twice the quantity required for the people's needs are produced), **wine** in Luxembourg, **sugar-beet, tobacco, and madder.** Also the crops cultivated in Holland.

The climate, being drier than that of Holland, is more suitable for **wheat and grapes.**

2. **Mineral.**—**HOLLAND** is particularly deficient in mineral wealth. **Marine peat** is dug and used for fuel. **Potter's clay** and **fuller's earth** are obtained in small quantities.

BELGIUM, on the contrary, is remarkably rich in minerals—**coal, iron, lead, manganese, zinc, and sulphur.** The chief **coal-fields** are those of Hainault and Liège, covering an area of about 500 sq. miles round the towns of **Liège, Mons, and Charleroi.**

The plateau of Central Belgium extends into Germany, and there are similar minerals in these countries, the coal being found on its north-west margin.

Iron-ore is found throughout Belgium, but chiefly in the provinces of **Liège and Namur,** close to the coal-fields. Hence the manufacture of iron is a great industry in Belgium. **Zinc** is mostly obtained near **Liège.**

POLITICAL GEOGRAPHY

HOLLAND.—**Manufactures.**—**Cotton, linen, and woollen spinning and weaving,** chiefly in the province of **Overijssel** at **Enschede** and at **Tilburg** in **North Brabant.** **Ship-building** at **Zaandam.** **Spirits, sugar, beer, vinegar, soap,** are also manufactured.

The lack of minerals is a hindrance to manufacturing industry in Holland, but in spite of this the production of textile fabrics is large. The regular sea-breezes supply the power for working numerous windmills, which not only pump out the water from the Polders but also grind corn, coffee and chicory, scutch flax and hemp, bruise oil-seeds, mash paper pulp, &c.

TRADE.—The Dutch have for many centuries been celebrated for the extent and variety of their commerce, which has been greatly increased by their numerous and important foreign possessions. The total value of Dutch exports per head of the population is greater than in any other country of Europe, and is equalled only by West Australia, where the population is scanty and gold is produced. The Dutch have a great carrying trade, and also import quantities of foreign produce to be re-exported.

MEANS OF INTERNAL COMMUNICATION.—These are excellent in Holland and Belgium. The rivers **Rhine, Maas, and Scheldt,** with their many tributaries and branches, afford easy navigation for hundreds of miles. The roads are excellent in construction and easy, because of the flatness of

the surface. Hence much merchandise is carried over the roads for long distances—*e.g.*, loaded waggons travel from **Brussels** to **Liège** (60 miles) and from **Antwerp** to **Liège** (72 miles). Holland is covered with a complete network of canals for navigation and drainage. The chief are:—

1. The **North Sea Canal**, for large ships drawing 26 ft., from **Amsterdam** to **IJmuiden**. This has largely superseded the North Holland Canal, from Amsterdam to the Helder.

2. A ship canal connecting **Ghent** with the **Scheldt** Estuary admits ships of 2,500 tons burden.

3. The **Campine Canal** connects **Antwerp** with the **Rhine** and also with the **Meuse** at **Maastricht**.

The total length of the canals of Holland is far in excess of the railways, roads, and rivers combined.

Railways.—The total length of Dutch railways is about 2,377 miles, almost equally divided between State and private ownership.

FOREIGN TRADE.—**Imports.**—**Wheat** and **flour**, **manufactured iron**, **textiles**, **drugs**, comprise over 50 per cent. of the total amount. Other important imports are—

Coal, rice, copper, oil-seeds, raw coffee, tallow and grease, and wood.

Exports.—The exports are in two classes—

1. The produce of farms, factories, mills and fisheries, as **butter**, **cheese**, **cattle**, **linseed**, **bulbs**, **linen**, **fish**, **spirits**, **textiles**, **flour**, **skins**.

2. Tropical and foreign produce generally, as **drugs**, **coffee**, **rice**, **tobacco**, **spices**.

Holland chiefly trades with Germany, the United Kingdom, Belgium, Dutch East Indies, Russia, and the United States, and Dutch merchants deal in every kind of merchandise.

SEAPORTS.—**Amsterdam** and **Rotterdam** are the chief.

Minor ports are Schiedam, Harlingen, Dordrecht, Groningen, and Flushing.

Amsterdam (647), on the IJ, a branch of the Zuyder Zee, where the Amstel enters the sea. It is connected with the North Sea across the peninsula of North Holland by the **North Sea Canal**, which admits the largest ships. Since the completion of this canal a great increase of commerce has taken place. The city is remarkable for being intersected by very numerous canals similar to those of Venice. Important ship-building and other industries are carried on, and Amsterdam is the centre of the diamond-cutting industry. This is chiefly in the hands of Jews, who are very numerous there.

Rotterdam (516), on the **Estuary** of the **Maas**, which is liable to be silted up by sediment brought down by the river. Hence a canal, the **New Waterway**, has been constructed, entering the North Sea to the north of the river mouth. The many deep canals enable the largest vessels to sail into the heart of the city. The commerce of Rotterdam is the most extensive of any Dutch port.

Flushing, on Walcheren Island, is the third port of Holland, and is the nearest point to the British Isles.

FIG. 149.—BELGIUM AND HOLLAND.



HOLLAND

PROVINCES AND TOWNS.—Eleven provinces, exclusive of the Grand Duchy of Luxembourg—viz. North and South Holland, Zeeland, North Brabant, Utrecht, Gelderland, Overijssel, Drenthe, Friesland, Groningen, and Limburg.

Amsterdam and Rotterdam. (*See Ports.*)

The Hague (354), in South Holland, is the political capital, and a handsome city with many fine buildings.

Utrecht (140), on the Vecht River, has important trade in cattle and grain, and is a manufacturing place. It is famous in history for the treaty of 1713.

Groningen, Haarlem and Arnhem are all towns with over 60,000 inhabitants; Haarlem being noted for the growth of flower bulbs.

Leyden (65), a very ancient town, renowned for its heroic resistance to the Spaniards in 1573-74. Its great University was founded by William of Orange (the Silent) as a memorial of the event. This town was the birth-place of the great painter **Rembrandt**.

Zutphen, in Gelderland, is memorable in English history for the death of Sir Philip Sidney in 1586, when aiding the Netherlands against the Spaniards.

Zaandam, on the Ij, north of Amsterdam, is the town where Peter the Great of Russia resided while learning ship-building.

POPULATION.—6,900,000, or 554 to a square mile. (1921.)

Compare with 373 in United Kingdom or 620 in England and Wales.

By far the densest population is in North and South Holland, where there are nearly 1,000 to the sq. mile.

PEOPLE.—The people, who are of Teutonic race, have always been distinguished by sturdiness and independence of character, and have been for many centuries a flourishing nation. Dutch women are well known for the extreme cleanliness of their dwellings.

FOREIGN POSSESSIONS.—Holland possesses in Asia—Java, parts of Sumatra, Borneo, and Celebes, with Amboina, the Moluccas, Banca, and other islands of Malaysia.

In America—Surinam or Dutch Guiana, with some small West India islands.

In Australasia—a large part of New Guinea.

In all, the extent of the Dutch foreign possessions is 779,000 sq. miles, or about sixty times the size of Holland.

BELGIUM.

MANUFACTURES.—The manufactures are most extensive and important owing to—

1. The abundance of **minerals**—coal, iron, &c.
2. The abundance of **raw materials**, as iron-ore, flax grown in the country, and wool from the Ardennes.

3. The convenience of the great port, **Antwerp**, for the reception of raw products from, and the distribution of manufactured goods to, other countries.

4. The energy of the people.

The chief are **linen, woollen, iron** in all its branches, and **cotton**. Glass, chemicals, beer, silk, leather, sugar, and porcelain are amongst the numerous goods produced.

1. **Linen** at **Tournai, Courtrai, and Ghent**, all near the flax-growing district. **Lace** from the finest flax fibre is made at **Brussels** and **Mechlin**.

2. **Woollen**—**Cloth** at **Verviers** (in province of Liège) where the industry has existed since 1432, owing to the freedom of the river water from lime, a special virtue for wool-washing. **Carpets** at **Tournai, Brussels**.

Much South American wool is manufactured in Belgium.

3. **Iron**.—Machinery is most important, and is made at **Liège** and **Seraing**. **Cutlery** at **Namur**. Miscellaneous iron goods at **Mons**.

4. **Cotton** at **Ghent** and **Mons**.

TRADE.—Belgium is remarkably well adapted for trade, having excellent communication internally by rail, canal, river, or road to all parts of the country and to the Continent generally.

Thus **Antwerp** is the centre for the distribution of goods from the Rhine Valley, Switzerland, and Italy; as well as the port for the reception of grain and petroleum from the United States, wool from South America, &c.

Comparison with the United Kingdom.—This shows (a) that both countries are alike in the expansion of the manufacture and export of machinery, but that Belgium does not keep pace with the United Kingdom, and in coal loses ground.

(b) That Belgium advances more rapidly than the United Kingdom in the production of linen and linen yarn and woollen yarn.

(c) That in both countries the import of grain has increased, but Belgium exports a large quantity while the United Kingdom has none for export.

(d) That the commerce of Belgium is largely carried on in foreign vessels, her mercantile marine being small.

RAILWAYS.—Belgian railways are under State management and all radiate from Mechlin; northwards to Antwerp, westwards to Ghent and Ostend, eastwards to Liège and Germany, southwards to Brussels and France.

FOREIGN TRADE.—**Imports**.—**Cereals** and flour, textile fibres, as wool, flax, hemp, cotton, &c., chemicals, minerals, timber, resin, hides, coffee, animals, &c.

Exports.—**Iron** and steel, machinery, wheat and other grain, coal and coke, flax, raw wool, glass, chemicals, &c.

The countries with which Belgium chiefly trades are Germany, France, Great Britain, the Netherlands, and the United States. The development

of Belgian commerce since 1870 has been most remarkable. The imports have nearly doubled in value, the exports have more than doubled, and a vast increase has taken place in the goods in transit.

SEAPORTS.—Antwerp, Ghent, Ostend, Bruges.

Antwerp (304) has a position on the Scheldt which for convenience of commerce rivals that of London. It is situated in the centre of the northern land hemisphere. Connected with a great river and canal system, it has vast inland as well as foreign trade. It was a great seaport in the Middle Ages, but declined in the sixteenth century and revived again after 1863, when the navigation of the Scheldt was made free. It is well fortified, and has numerous important industries.

Ghent (165), an ancient manufacturing town at the junction of the **Lys** and **Scheldt**, is connected with the estuary of the Scheldt by a canal.

Bruges (53) is connected with **Ostend** by a canal. In the fourteenth and following century Bruges was at the head of the Hanseatic League, but is now much decayed, and chiefly interesting for its historical buildings and associations and its works of art.

Ostend (45) is an important packet-station for England and also a watering-place.

PROVINCES AND TOWNS.—Nine provinces—viz. Brabant, East and West Flanders, Hainault, Antwerp, Limburg, Liège, and Namur.

Brussels (775, with suburbs), on the **Senne**, a tributary of the Scheldt, is the capital and a very important manufacturing city. A few miles to the south is **Waterloo**. **Antwerp**, **Ghent**, and **Bruges**, already referred to under seaports.

Liège (165), the centre of the iron manufacturing industry, **Courtrai**, **Verviers**, **Tournai**, **Namur**, and **Mons** are all busy manufacturing towns.

Mechlin (59), or **Malines**, on the **Dyle**, a tributary of the Scheldt, is the centre of the railway system and manufactures lace.

POPULATION.—Over 7,400,000, or 636 to a sq. mile, in 1921. England and Wales in same year had 649 to a sq. mile. Next to Saxony, Belgium is the most densely peopled country on the Continent.

PEOPLE.—The Belgians are of two distinct races, the Walloons and the Flemings—the former descended from the Celtic Belgæ and having a French dialect; the latter a Teutonic race allied to the English, Dutch, and Frisians. The Walloons generally dwell in the higher lands and the Flemings in the plain, but there is no distinct line of demarcation. The language of the educated and official classes is French.

LUXEMBOURG has an area of about 1,000 sq. miles, with a population of about a quarter of a million. It is an independent country. Contains valuable iron mines. The chief town is Luxembourg, the Capital.

FOREIGN POSSESSIONS.—The Belgian Congo, a country with an area of over 900,000 sq. miles, and a native population of about $8\frac{1}{2}$ millions.

EXAMINATION PAPERS

- A. 1. Describe the coast line from Dollart Zee to the French boundary.
2. Name the local causes which affect the climate of the Low Countries.
3. Indicate the extent and name the streams of the Rhine Delta.
4. Where and what are Texel, The Polders, Kempen Land, Ardennes, Maas, Zuyder Zee, Lys, Ghent, Mons, the Ij?
- B. 1. Give an account of the mineral wealth of Belgium and Holland, and show the effects of its abundance or scarcity upon the respective countries.
2. Describe the river Maas from source to mouth, showing the character of its basin, the chief industries in its valley, and the chief towns upon it.
3. Name the agricultural products of Belgium and Holland, and account for any differences.
4. Give reasons for the remarkable character of Dutch commerce and compare with that of Belgium.
- C. 1. Name the seaports of Belgium and Holland and give some account of the chief one in each country.
2. What goods are exported from Holland?
3. Name the provinces of Holland.
4. What do you know of The Hague, Utrecht, Zaandam, Leyden, Zutphen, Brussels, Bruges, Mechlin, Ramillies, Liège?
- D. 1. Name four manufactures of Belgium, with some towns in which carried on.
2. Explain why the winter climate of Holland and Belgium is so much more severe than that of southern England.
3. Compare Holland with Belgium in size, population, and people.
4. What foreign possessions has Holland?
-

GERMANY

GENERAL DESCRIPTION.—Before the Great War the German Empire was composed of a number of States, of which the most important was Prussia. The end of the war saw the break up of the Empire and the formation of a federation of Republics, of which the principal members are the old kingdoms of Prussia, Bavaria, Württemberg and Saxony.

Germany is favoured with a temperate climate, fertile soil and abundant mineral wealth. She has a long extent of seaboard with deep estuaries upon which sea-ports have been built providing access to the markets of the world, and the country is consequently peopled by a numerous and busy nation. The highlands of Germany are all in the southern portion, and the general slope of the country is towards the north. Hence the rivers, with one exception, take a northerly course, and, as they flow across a wide plain, are long and generally slow. From being either in contact with, or near to, many populous countries, the German people carry on an extensive commerce.

BOUNDARIES.—**North.**—North Sea, Baltic Sea, and an artificial boundary towards Denmark.

West.—Between Holland, Belgium, and France the boundary is artificial, except that the **Vosges Mountains**, and the **R. Rhine** for a short distance, separate Germany from France in the south-west.

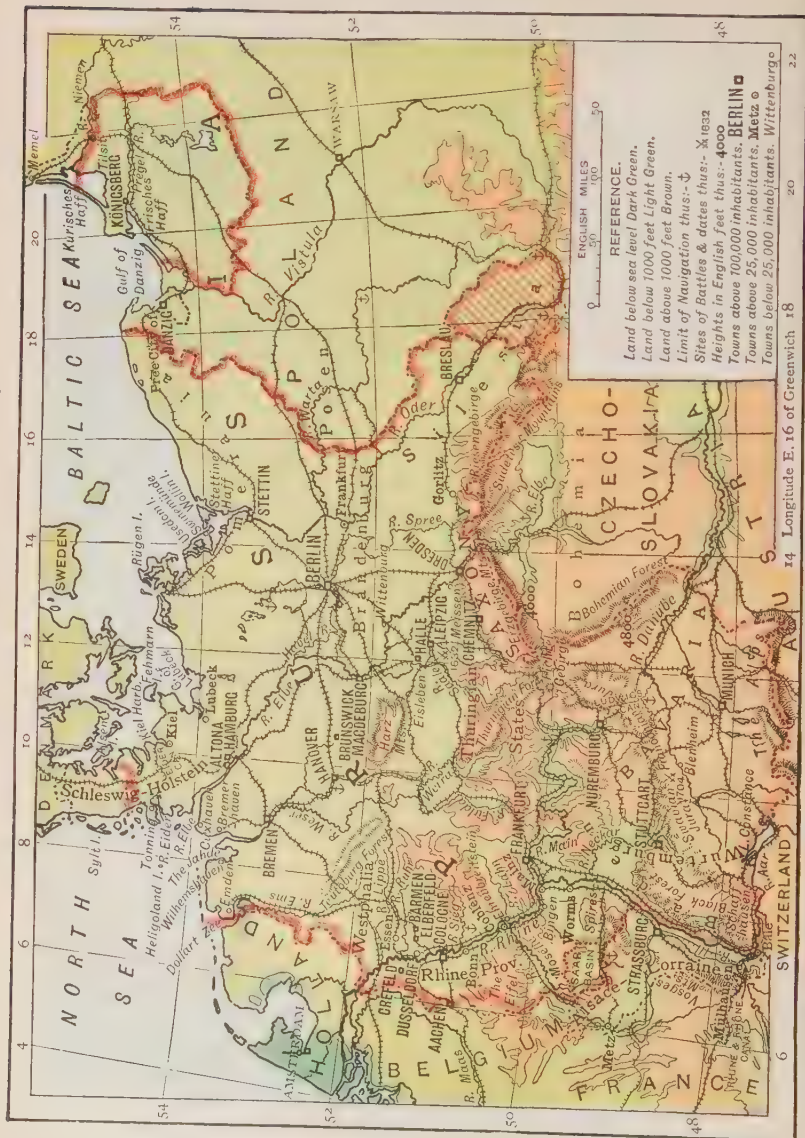
East.—Poland and Russia.

South.—The **R. Rhine**, **L. Constance**, the **Alps**, and the mountains which lie round the Bohemian Plateau, and extend from the Danube to the Oder.

SIZE.—About 182,000 sq. miles, or about $1\frac{1}{2}$ times the size of the British Isles.

RELIEF.—The north and east of Germany form part of the **Great Plain of Europe**, which extends from the Netherlands eastwards through Russia to the Ural Mountains. The south-west, where Germany is widest from north to south, consists of **highlands** of varied character. The **Northern Plain** consists mostly of heathy moorland, with rather barren soil, and hence the population there is sparse.

FIG. 150.—NORTHERN CENTRAL EUROPE.



PLATEAUX.—The plateau region of Germany falls into three divisions:—

1. The district bounded on the south-east by the **Erzgebirge**, south-west by the **Thuringian Forest**, and north by the edge of the **Great Plain**, to which the surface gradually descends.

In this triangular plateau are included a large part of Saxony and the Thuringian States.

2. The district bounded on the north-east by the **Thuringian Forest**, south-east by the **German Jura**, and west by a slate plateau through which the Rhine passes in a deep valley.

This plateau is also triangular, with a long base towards the Rhine.

3. Nearly the whole of **Bavaria**, bounded on the south by the Alps, north-west by the German Jura, and east by the Bohemian Forest.

The average height of this plateau is about 1,600 ft.

MOUNTAIN RANGES.—Taking the **Fichtel Gebirge** in the north-east of Bavaria as starting-point, the mountain ranges radiate in four directions:—

1. The **Erzgebirge** to the north-east, continued into the **Sudetes**. Part of the latter is known as the **Riesengebirge**, where the highest point is **Schneekoppe**, 5,274 ft.

2. **Thuringian Forest** to the north-west, stretching towards and gradually merging in the plain.

3. The **Bohemian Forest**, 4,000 to 4,500 ft., to the south-east, dividing Bohemia from Bavaria.

4. The **German Jura** to the south-west. This consists of the **Franconian** and **Swabian Jura**. The latter approaches the **Swiss Jura** between **Bâle** and **Lake Constance**.

From the south-west corner of Germany the **Vosges Mountains** (under 5,000 ft.) lie parallel to the Rhine, at a short distance, on the west of the river. The **Black Forest** lies on the east of the Rhine and also parallel to it.

These two ranges enclose the valley through which the Rhine flows between **Bâle** and **Mannheim**.

The **Alps** forming the northern wall of the **Tyrol** lie to the east of **Lake Constance**.

The **Harz Mountains** (highest point 3,658 ft.) stretch across Central Germany parallel to the **Thuringian Forest** and some distance to the north.

Lesser Ranges are:—The **Teutoburg Forest**, a sandstone ridge, between the **Ems** and **Weser**.

The **Eifel**, an ancient volcanic highland west of the Rhine, between the **R. Moselle** and the **Ardennes**.

PLAINS.—From the borders of Holland and Belgium **Northern Germany** forms part of the Great European Plain.

In the west the country resembles Holland, and is very fertile; but in the centre and east the surface is slightly rolling, with somewhat barren soil. In the country bordering upon the Baltic the soil is sandy or heathy, and many shallow lakes are found.

Comparison of Relief with that of France.—As in France, the highlands are mostly in the south and south-east, and the land slopes to the north-west. Hence, the general direction of the rivers is north-west, with the exception of the Danube, which drains the south-east slopes of the mountain ranges. The position of the highlands has an important effect upon the climate.

COAST LINE.—The coast line bordering upon the North Sea is low and sandy like that of Holland, with several large openings. The Baltic coast is generally higher than that of the North Sea, rising in places to 500 ft. in height; but subsidences have happened in several places, causing the formation of **Rugen Island** and of the **Frisches Haff**.

Openings.—1. In the **North Sea.**—The **Dollart** (or **Dollart Zee**), **The Jahde**, the estuaries of the **Weser** and **Elbe**.

2. In the **Baltic.**—**Kiel Harbour**, Gulf of **Lübeck**, **Stettiner Haff**, Gulf of **Danzig**, **Frisches Haff**, and **Kurisches Haff**, the last two being separated from the Baltic by narrow spits of land, and being of the nature of lagoons.

ISLANDS.—The North Sea islands are in two groups, the **Frisian** and North **Frisian**, separated by the **Elbe Estuary**. The largest island is **Sylt**, in the northern group. Between these groups lies **Heligoland**, which was ceded by England to Germany in 1890.

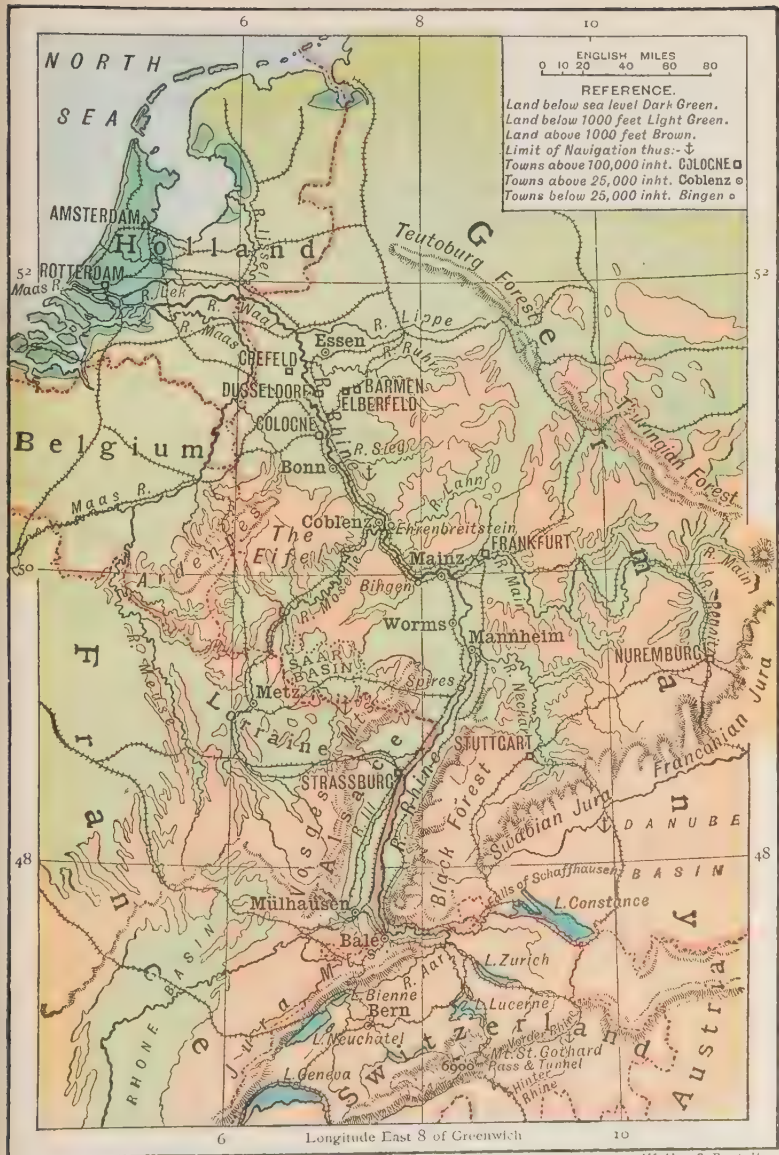
The Baltic Islands are numerous, consisting of **Fehmarn** and **Alsen** on the east coast of Schleswig-Holstein, and the large island of **Rugen**, which has a most curious shape. **Usedom** and **Wollin** lie in the entrance of **Stettiner Haff**, leaving only three narrow channels for traffic with the river **Oder**.

CLIMATE AND RAINFALL.—The climate of Germany is temperate and healthy, but greater extremes of temperature are experienced than in the more western countries of Europe. The elevated part of Germany being in the south, and the plains in the north, there is not so much variation between the climates of the northern and southern parts as might be expected from the difference in latitude.

The rainfall is sufficient, and is especially abundant in the **Harz Mountains**.

The most pleasant climate is enjoyed in the Rhine valley between the **Vosges** and the **Black Forest**, this valley having a southern aspect.

FIG. 151.—THE RIVER RHINE.



Local causes which modify the climate of Germany:—

1. The country is little influenced by the ocean, and hence the greater winter cold and summer heat.
2. The lack of any mountain barrier against northern and eastern cold dry winds helps to make the winters severe.
3. The presence of highlands in the south, which by their elevation cause the summer heat to be lessened and also prevent warm south winds from freely affecting the northern regions.

RIVERS.—Germany closely resembles France in the general north-western direction of its rivers, and in the slowness of current which makes them navigable for long distances. The rivers whose courses are wholly or partly in Germany are numerous and important. The main water-parting is far enough from the sea for the streams to be of considerable length.

The **Danube** is the only river in Germany which does not reach the North or Baltic Seas.

1. **Rivers Flowing into the Baltic.**—**Niemen** (400 miles) into **Kurisches Haff**, and the **Pregel** into **Frisches Haff** are rivers of the plain, and consequently have slow currents. The former is almost entirely in Russia. The chief town on the Niemen is **Tilsit**, where the treaty with Napoleon Bonaparte was concluded in 1807.

Vistula (630 miles) rises in the **Carpathian** mountains and drains Poland, so that only a part of its course is in Germany.

Oder (550 miles) is almost entirely in Germany, passing through **Silesia**, **Brandenburg**, and **Pomerania**. This river, like the **Elbe**, is slow, and is navigable through almost its whole length. The chief tributary is the **Warta**. The principal towns on its banks are **Breslau** and **Frankfurt**, important commercial places, and **Stettin**, a port.

2. **Rivers Flowing into the North Sea.**—The **Elbe** (690 miles) rises on the southern side of the **Riesengebirge**, drains the Bohemian plateau, and, after receiving the **Moldau**, enters Germany through the limestone district called **Saxon Switzerland**. Its chief tributaries are, on the right bank, the **Havel**, which receives the **Spree**; and on the left the **Saale**. The chief towns are **Dresden**, **Magdeburg**, **Hamburg**, and **Altona**, all old commercial cities on the main stream; **Berlin**, on the **Spree**; **Halle**, on the **Saale**.

The **Weser** (380 miles) and the **Ems** drain the German plain between the **Elbe** and the **Rhine**. The **Weser** is formed by the **Werra** and **Fulda**, which drain the Thuringian Forest and the Harz Mountains. Chief towns on the **Weser** or its tributaries—**Bremen**, **Hanover**, and **Brunswick**.

The **Rhine** (760 miles) drains an area of nearly 70,000 sq. miles in Switzerland, Germany, and the Low Countries, and is joined near its mouth by the **Maas**, known in Belgium and France as the **Meuse**. It is formed in Switzerland by the **Vorder Rhine** and **Hinter Rhine**, and after passing through **L. Constance** (Ger. **Bodensee**) forms the boundary between Switzerland and Germany, receiving on its left bank the **Aar**, which drains Lakes **Neuchatel**, **Zurich**, and **Lucerne**. At **Bâle** the river turns northwards, and continues its course in first a north-east and then north-west direction, till it enters the North Sea, after forming a large delta in Holland. The stream is swift except in the lower course, but is navigable for boats up to the Falls of **Schaffhausen**. The Rhine Valley between the **Vosges** and **Black Forest** is famous for its fertility and pleasant climate. Between

Bingen and **Bonn** the channel is cut through a slate plateau, and the banks are high. Numerous towns of ancient fame and of modern importance are on the banks of the Rhine and its tributaries—viz. **Bern** on the Aar, **Mainz**, **Coblentz**, **Cologne**, **Dusseldorf**, **Rotterdam**, **Strassburg** on the Ill, **Frankfurt** on the Main, **Metz** on the Moselle.

The chief tributaries are:—On the **Left** bank, the **Aar** and **Moselle**; on the **Right** bank, the **Neckar**, **Main**, **Lahn**, **Sieg**, **Ruhr**, and **Lippe**.

FERTILITY OF SOIL.—Of the soil of the whole German Empire, nearly one-half is arable land, one-fourth woods and forests, about one-fifth under grass, and but a small fraction unproductive.

The soil varies very much in productiveness, though as a rule it is fertile. Generally speaking, the river valleys are fertile, especially those of the Rhine and its tributaries the Neckar and Main. The Great Plain contains many sandy or heathy tracts, but the districts bordering upon the rivers are fertile. The soil of the North is best suited for corn and other heavy crops, while that of the South is light and adapted to the growth of the vine.

PRODUCTS.—1. **Agricultural.**—1. Cereals in order of their production, **rye**, **oats**, **wheat**, and **barley**, and to a very much less extent, **buckwheat**.

2. **Potatoes** are very extensively grown; also **beetroot**, both for sugar and fodder, and **hay** and other green crops as in England.

3. The **vine**, **hops**, and **tobacco** are important objects of culture.

Animals in order of number:—Sheep, cattle, swine, horses, goats; also a very large number of bees.

2. The **Fisheries** are relatively unimportant, and the number of men employed diminishing. The Baltic Sea Fishery is the most important.

3. **Mineral.**—In total value of mineral produce Germany is next to the United Kingdom amongst European countries, and is exceeded only by the United Kingdom and Belgium in production relative to area and population.

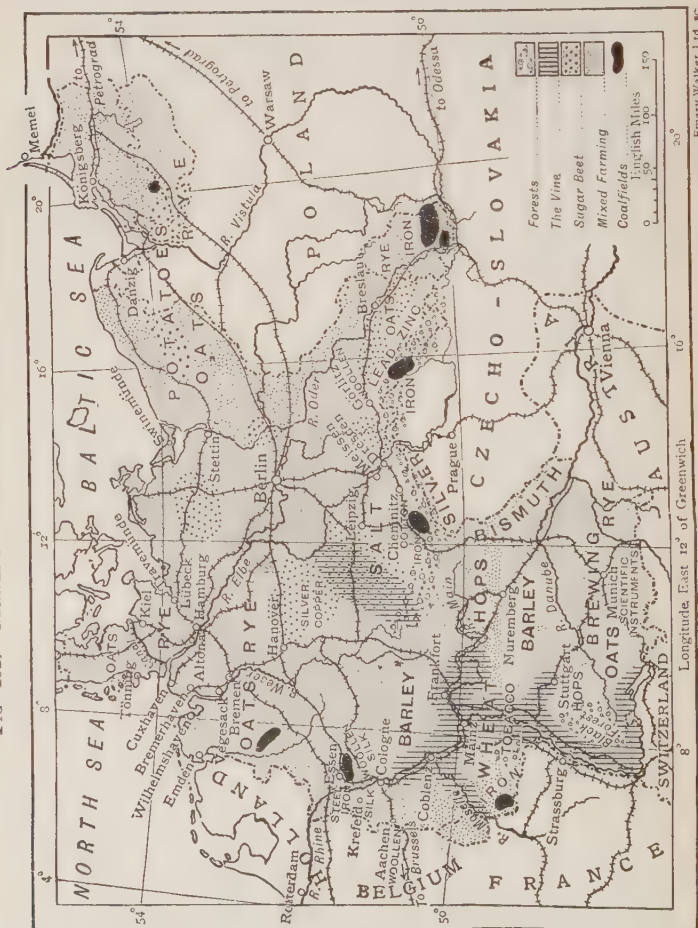
The chief minerals are **coal**, including lignite, and **iron**, and the others of importance in order of production are:—Potassic salt, copper-ore, rock-salt, zinc-ore, and lead. In addition to these, **gold**, **nickel**, and **bismuth** are obtained.

Prussia produces the bulk of the mineral wealth, **coal** and **iron** being abundant in Westphalia, Rhenish Prussia, and Silesia; **silver** and **copper** in the Harz Mountains, and zinc in Silesia; **coal**, **iron**, and **silver** are obtained in Saxony, and Lorraine has **coal-fields**; lignite in the Thuringian States.

Coal-fields.—The chief are:—1. The **Ruhr Valley** in Westphalia. 2. That of Saxony. 3. The **Silesian Coal-field**.

Iron.—The ore is found generally near the coal, and is smelted on many of the coal-fields, but mostly in the **Ruhr Valley**.

FIG 152.—GERMANY. VEGETABLE & MINERAL PRODUCTS.



Salts.—Potassic salts found in Saxony have caused a great chemical industry to spring up at **Stassfurt**, where are produced carbonate, sulphate, and nitrate of potash. Common salt is produced chiefly in Saxony.

MANUFACTURES.—The chief manufacturing provinces are the Rhine Province, Westphalia, Silesia, Saxony and Württemberg. **Iron**, including steel and electrical machinery; **cotton**, **woollen**, and **silk** fabrics are the chief. Others are sugar, glass, porcelain and earthenware, clocks and wooden ware, beer, chemicals, pianos, scientific instruments.

Iron and steel.—The chief seats of this manufacture are in Prussia, Bavaria, and Saxony—especially in the Ruhr Valley, at **Essen**, where the famous Krupp works are situated.

Cotton goods at **Chemnitz** in Saxony; also at **Mulhausen** in Alsace-Lorraine. Much cotton is re-exported from Liverpool for manufacture in Germany.

Woollen goods at **Barmen** and **Elberfeld** in the Ruhr Valley, **Aachen** in the Rhine Province, and at **Gorlitz** in Silesia. The finest wool is obtained from South America.

Silk at **Krefeld** in the Rhine Province, **Barmen** and **Elberfeld**.

Sugar is made in increasing quantities from beetroot in several provinces; **glass**, **porcelain**, and **earthenware** in **Silesia**, **Thuringia**, and **Saxony**, porcelain especially at **Meissen** in Saxony, where 'Dresden' china is made; **clocks** and **toys** in the **Black Forest** and in **Bavaria**; **beer** in **Bavaria** and **Prussia**; **chemicals** chiefly at **Stassfurt** in Saxony, but also at many other places.

Pianos at **Berlin** and **Stuttgart**; **scientific instruments** at **Munich**.

COMMERCE.—The commerce of Germany is under the control of the Zollverein, or Customs Union, formed in 1818, and made to practically include all Germany by the admission of the free cities, Hamburg and Bremen, in 1888. Now only a few small districts remain outside this Union, which was formed to ensure uniformity in the levying of customs duties in the various States of the Empire. All payments are received into a general fund, from which each State receives in proportion to its population.

German commerce has grown more rapidly in the last quarter of a century than that of any other European country. The following are some of the reasons for this expansion:—

1. The great development of the mineral wealth.
2. The extension of the railway system, especially by the Alpine tunnels.
3. The war indemnity from France in 1871 gave a great impetus to trade.
4. The advanced state of commercial and technical education in Germany.

MEANS OF INTERNAL COMMUNICATION.—Rivers, canals, and railroads afford ample means of communication between the various parts of the German Empire. The rivers in most cases are navigable nearly to their sources, and vast quantities of merchandise pass along them in spite of the competition of the railway system. Great rafts of timber are floated down

the rivers from the forest districts to the seaports. Canals join all the chief rivers and make a network of waterways. The chief are:—

1. The **Rhine and Rhone Canal**, joining those rivers, and also connected with the **Seine** system.

2. **Ludwig's Canal**, joining the **Main** with the **Danube**.

3. The **Eider Canal**, from **Kiel Bay** to the river **Eider** and so to the North Sea.

4. A **Ship Canal** has been constructed from the mouth of the **Elbe** to join the **Eider Canal** and so avoid the passage of the Sound.

The chief centres of internal trade are **Munich**, on the **Isar**, the great railway centre of Southern Germany; **Breslau**, on the **Oder**, a great collecting centre for the produce of neighbouring provinces. **Leipzig**, in Saxony, famous for its great fairs. **Frankfort**, on the **Main**, a very important banking and commercial city.

RAILWAYS.—There were over 35,000 miles of railway open (1920) for traffic in Germany, nearly all being owned by the Imperial or State Governments.

The railway system is connected through the **St. Gothard Tunnel** and the **Brenner Pass** with that of Italy. This junction of systems has largely increased German commerce.

TRADE.—The total trade of Germany for the year 1913 was about one thousand millions of pounds as compared with £1,340 mills. of the United Kingdom.

Imports.—Raw cotton, hides and skins, wheat, wool, barley, coal, copper, coffee, iron-ore, raw silk.

Exports.—Iron and iron goods, silk goods, machinery, cotton goods, woollen goods, coal, sugar, leather and manufactures.

The countries which share most largely in German trade are the United Kingdom, the United States, Austria, Hungary, Czecho-Slovakia, the Netherlands, France, Russia, and Switzerland.

The United Kingdom is first both in imports and exports, Austria, Hungary second in imports, North and Central America second in exports.

Germany sends to the United Kingdom sugar, cottons and yarns, woollens and yarn, wood and manufactures, glass and manufactures, machinery, eggs.

Germany obtains from the United Kingdom cottons and yarn, coal, coke, &c., woollens and yarn, machinery, herrings, iron-work, wool.

Hamburg and **Bremen** are the ports through which most of the trade goes to the United Kingdom and the United States.

SEAPORTS.—The chief ports in order of importance are **Hamburg** with **Cuxhaven**, **Bremen** with **Bremerhaven** and **Vegesack**, **Stettin**, **Rostock** (**Warnemünde**), **Lübeck**, and **Altona**.

Germany is lacking in good harbours, there being only two, **Bremerhaven** and **Cuxhaven**, which admit the largest vessels. **Hamburg** and **Swinemünde** admit vessels not drawing more than

23 feet. **Bremen** has ceased to be a port, as ships stop ten miles down the river at **Vegesack**; and **Bremerhaven**, which is near the sea, is an outport of Bremen.

Other ports are **Emden** and **Memel**. **Kiel** and **Wilhelmshaven** are naval ports. Much of German commerce passes through **Rotterdam** and **Antwerp**.

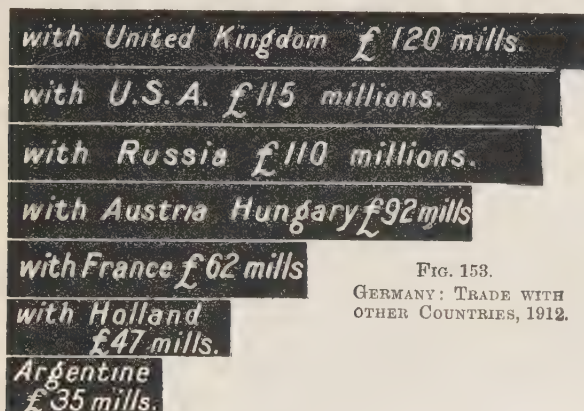


FIG. 153.
GERMANY: TRADE WITH
OTHER COUNTRIES, 1912.

NORTH SEA PORTS.—**Hamburg** (985), the first port of Germany, ranks as the fifth seaport of the world. Its position on the **Elbe Estuary** and its connection with the river and canal systems of Germany cause it to have very great traffic.

Cuxhaven, a port belonging to Hamburg, nearer to the sea, is convenient especially in winter, when the **Elbe** is obstructed by ice.

Altona (168), also on the **Elbe**, near Hamburg, has trade similar to that port, and is also a Free City.

Bremen (269), on the **Weser**, has great trade, being a centre for the collection of merchandise of the adjoining States; but nearly all vessels stop at **Bremerhaven**, an outport near the sea, belonging to Bremen. **Emden**, at the mouth of the **Ems**, and **Tonning**, at the mouth of the **Eider**, are other ports on the North Sea. **Wilhelmshaven**, on the **Jahde**, is the only naval station unfrozen in winter.

BALTIC PORTS.—**Kiel**, on **Kiel Bay**, is the chief German naval port, and is also of commercial importance.

Lübeck, on the Gulf of Lübeck, was once the head of the Hanseatic League, but is now of less consequence. Its outport is **Travemünde**.

Stettin (232) at the mouth of the **Oder**, is the third port of Germany, being almost equal with Bremen in the amount of its trade. It is the seaport nearest to **Berlin** and **Silesia**. Its outport is **Swinemünde**.

All the Baltic ports are much hindered by the freezing of that sea in winter and the consequent interruption of traffic.

POLITICAL DIVISIONS.—The German Federation of States consists of a number of Republics, each with its own President and Government. The most important are the old kingdoms of **Prussia, Bavaria, Saxony and Würtemberg.**

INLAND TOWNS.—**Berlin** (over 3 mills.), on the Spree, the capital of the empire and the chief banking centre, is of comparatively recent growth. It has many industries, the chief being machinery. Its rapid progress is due to its political pre-eminence and its position in the centre of the German Plain. The Berlin University is very famous, and has over 5,000 students.

Munich (636), on the Bavarian Plateau, is an ancient town, and is now a great railway and commercial centre. It has a famous University with over 3,000 students, and great art galleries, which are much resorted to by artists.

Breslau (528) has been an important commercial centre for many centuries, its position causing it to be a convenient place for the interchange of Eastern with Western products. The proximity of a coal-field has caused great manufacturing industries to spring up, notably iron.

Leipzig (604) is situated at the junction of two ancient trade routes and was long famous for its great fairs, held twice a year, for the interchange of merchandise, especially of books, furs, and woollen goods. It is now the seat of the Supreme Law Courts, and of a great University.

Cologne (633), on the Rhine, famous for its great cathedral, which was commenced in the thirteenth century and completed in 1880. Its name is also familiar in connection with the scent called Eau-de-Cologne.

Dresden (587), the capital of Saxony, is famous for its art treasures, the beauty of its situation, and its mild climate, which caused it to be the residence of many English people of means.

Magdeburg (285), in Saxony, the centre of the German sugar industry, and famous in history, especially for its sack by Tilly in 1631.

Nuremberg (Nurnberg) (353), in Bavaria, was in the Middle Ages the chief manufacturing town of Germany, and is still important in manufactures and commerce. Its chief industries are toys, lead pencils, and artistic metal work.

Frankfort-on-the-Main (433) was once a free town and long the chief centre of German exchange and banking, though now eclipsed by Berlin. It is also famous as the birthplace of Goethe, the greatest of German poets.

Hanover (392), a great railway centre, and **Stuttgart** (176), the capital of Würtemberg, are important cities.

Aachen (Aix-la-Chapelle), familiar in English history, **Halle**, and **Brunswick** are all important cities with more than one hundred thousand inhabitants. **Barmen**, **Elberfeld**, **Gorlitz**, **Meissen**, **Stassfurt**, **Chemnitz**, **Essen**, and **Krefeld** have already been mentioned in connection with various manufactures. **Eisleben**, **Wittenberg**, **Worms**, and **Spire** are all of interest from their connection with Martin Luther and the rise of Protestantism. **Homburg**, **Baden**, and **Kissingen** are famous for their medicinal springs.

POPULATION.—About 60 millions (in 1919). The population is most dense in Saxony and neighbouring States. Saxony

is the most densely peopled of any considerable State in Europe, having over 800 to a sq. mile.

There are 44 towns of over 100,000 inhabitants.

PEOPLE.—The people of Germany belong mainly to the Teutonic branch of the Aryan race, with probably some mixture of Pre-Aryans in the south, though these adopted the language and customs of their conquerors. In the eastern province the Slavonic element is strong, but most of the German Slavs speak German dialects.

FOREIGN POSSESSIONS.—Germany lost all her foreign possessions in the Great War.

EXAMINATION PAPERS

- A. 1. State the dimensions of Germany; compare its extent with that of the British Isles, and give the area of Prussia.
2. Indicate the position and describe the Plateau region of Germany.
3. Describe the Rhine, accompanying your answer with a sketch-map.
4. Where and what are the Eifel, the Eider, Rugen, Black Forest, Saxon Switzerland, the Jähde, Erzgebirge, Barmen, Nurnberg, the Spree?
- B. 1. Give an account of the mountain systems of Germany, proceeding systematically, and indicating the direction of the ranges.
2. Say what you can of the plain of Northern Germany.
3. Describe the climate of Germany, giving any local causes.
4. Name the rivers flowing into the Baltic Sea and describe the Oder, naming any towns in its basin.
- C. 1. Name four of the principal manufactures of Germany, stating the provinces and towns chiefly connected with them.
2. Describe the coast-line of Germany, stating any disadvantages for commerce.
3. What goods does Germany sell to England and what does she receive in exchange?
4. Indicate the exact position of the following towns and give any facts of interest connected with them:—Berlin, Munich, Hamburg, Bremen, Strassburg, Magdeburg, Breslau, Cologne, Frankfort-on-the-Main, Kiel.
- D. 1. What physical conditions have been favourable to the growth of German manufactures?
2. By what canals can goods pass from German to French rivers, from the Rhine to Danube, and between the North and Baltic Seas?
3. What are the chief minerals of Germany, where found and manufactured?
4. Name the chief vegetable products, where cultivated, and give any reasons for particular localities suiting different objects of culture?

- E. 1. What foreign possessions has Germany lost in Africa? State their exact positions.
2. State any reasons for the modern growth of German commerce.
3. Where and what are the German Jura, Teutoburg Forest, Harz Mountains, Bohemian Forest, Sylt, Heligoland, Usedom, Alsen, Niemen?
4. In what ways is the climate of Germany affected by the highlands of the Southern part of the Empire and the flat nature of the country in Western Russia?
-

THE ALPS

POSITION.—By the term ‘**The Alps**’ is meant the system of mountains which, sweeping round west and north from the **Gulf of Genoa**, forms the boundary between **Italy** and **France** and also between **Italy** and **Switzerland**, occupies four-sevenths of the surface of **Switzerland** and a large part of **Western Austria**. Though not covering so great a surface as either the Scandinavian or Ural Mountain systems, the Alps are the most important mountain system in Europe. They have the highest peaks, the greatest average height, and lie between countries which have long been highly civilised. The length of the system on the outer side (towards France and the north) is 800 miles, and on the inner (Italian) side, 460 miles.

OUTLINE.—A continuous range, under the names **Maritime** (or **Sea**), **Cottian**, and **Graian Alps**, extends from near **Genoa** to **Mont Blanc**. This range has a central ridge, with numerous transverse spurs and valleys stretching into Italy and France, and here the range is narrowest. Turning eastward at **Mont Blanc**, the system opens out and consists of a number of parallel chains, running generally east and west, with important longitudinal valleys and numerous narrow transverse valleys. The chief longitudinal valley is that of the **Upper Rhone**, bounded on the north by the **Bernese Alps** and south by the **Pennine Alps**.

In this region, and directly to the east, the system has its highest peaks, greatest glaciers and waterfalls, and chief river valleys.

FORMATION.—The system, generally speaking, is formed of a middle region of hard rocks (gneiss and granite) with fringes of limestone mountains and hills on either side, though on the inner side the limestone formation is found east of **Lake Maggiore** only. The middle region contains the most striking features of the system. The slope of the range is generally more abrupt towards the Italian side than to the north; and hence the more striking appearance of the mountain summits as seen from **Milan** than from **Bern**.

THE FORE ALPS.—From a height of 2,000 ft. to 6,000 ft. the system is generally known as the **Fore Alps**. This is the

FIG. 154.—SWITZERLAND: RELIEF.



forest region, and is generally the limit of permanent human habitation.

THE ALPS.—From 6,000 ft. to the snow-line (9,000 ft. on the north or 8,000 ft. on the south) is the region properly called **The Alps**, where in summer the herdsmen tend cattle on the mountain pastures and live in *châlets*. Above 9,000 ft. is the region of perpetual snow. Though so high, the Alps contain numerous passes, and have never proved insuperable obstacles to communication. In this they differ from the **Pyrenees**, the **Himalayas**, and the **Caucasus**, which have very few passes.

The chief limestone regions are in the **Jura Mountains**, in the peninsula of **Istria** bordering on the Adriatic, called **Karst** (German) or **Carso** (Italian), and in Northern Italy. These are remarkable for the manner in which the rainfall disappears from the surface to form subterranean rivers. There are numerous wonderful caves also in these districts, that of **Adelsberg** in the **Karst** being the largest in Europe. **Lake Zirknitz**, in the same district, is remarkable for the occasional complete disappearance of its waters, when its bed may be cultivated.

DIVISIONS, RANGES, AND PEAKS.—1. The **Western Alps**.—This division comprises the **Ligurian Alps**, the connecting link with the Apennines, the **Maritime**, **Cottian**, and **Graian Alps**. The chief peaks are **Mts. Viso**, **Cenis**, and **Little St. Bernard**.

2. The **Central Alps** extend from **Mont Blanc** to the eastern frontier of Switzerland, and comprise the **Pennine Alps**, with **Mont Blanc** (nearly 15,800 ft.), **Monte Rosa** (15,200 ft.), and the **Matterhorn** (nearly 15,000 ft.); **Bernese Alps**, or **Bernese Oberland**, with **Finsteraar Horn** (14,000 ft.), and **Jungfrau** (nearly 14,000 ft.); **Lepontine Alps**, with **Mt. St. Gothard** (12,000 ft.); and **Rhætian Alps**, forming the eastern boundary between Italy and Switzerland. The chief peak is **Ortler Spitze**.

3. The **Eastern Alps** are in two divisions. The main portion, under the names of **Carnic** and **Noric Alps**, occupies the country known as the **Tyrol**; the other extends south-eastwards, under the names of **Julian** and **Dinaric Alps**, and joins the **Balkan** system. The highest peak in the **Tyrol** is **Gross Glockner** (12,450 ft.).

PASSES.—The chief Alpine passes mostly cross at a height of from 6,000 to 8,000 ft., though the **St. Théodule**, between the valleys of the Rhone and **Dora-Baltea**, a tributary of the Po, reaches an elevation of nearly 11,000 ft., and the **Stelvio** is over 9,000 ft. Many of the passes are crossed by good carriage roads, but their use in commerce has been much diminished by the construction of the great railway tunnels through **Mts. St. Gothard** and **Cenis**, the **Simplon Tunnel**, and the railways over the **Brenner** and **Semmering** Passes. Some of the chief passes are:—

1. In the **Western Alps**: **Mont Cenis Pass**, between the valleys of the **Isère** in France, a tributary of the Rhone, and the **Dora-Riparia**, a tributary of the Po. This pass was formerly much used, but the traffic between France and Italy now passes through the **Mont Cenis Tunnel**.

2. In the **Central Alps**: the famous **Great St. Bernard**, between the valleys of the **Upper Rhone** and **Dora-Baltea**.

The **Simplon**, from the **Upper Rhone Valley** to that of the **Toce**, which flows into **Lake Maggiore**.

The **St. Gothard**, between the valleys of the **Reuss** and **Ticino**. This has been superseded by a great tunnel nearly ten miles long, by which Switzerland and Northern Europe are brought into easy communication with Italy.

The **Furca**, from the **Upper Rhone Valley** to that of the **Reuss**. This is the most important of the passes joining the longitudinal valleys.

3. In the Eastern Alps: The **Brenner** and **Semmering** Passes, though of comparatively low elevation, are of great importance from the railways passing over them. The **Brenner** joins the **Inn Valley** with the basin of the **Adige**, and is the great trade route between Italy and Northern Europe. The **Semmering Pass**, in the easternmost part of the Alpine system, is the trade route between **Trieste**, **Vienna**, and **South-east Germany**.

VALLEYS AND LAKES.—The great valleys are occupied by the upper courses of the various important streams, from which they take their names—viz. the **Rhone**, **Rhine**, **Inn**, **Ticino**, **Adige**, **Reuss**, &c.

The valley of the **Inn** is called the **Engadine**, and is now famous as a winter health resort, **Davos** and **St. Moritz** being the towns most frequented by invalids.

Numerous and important lakes also lie in the outer valleys—viz. **Geneva** or **Leman**, **Thun**, **Brienzen**, **Lucerne**, **Zug**, and **Zurich**, in Switzerland; **Maggiore**, **Garda**, **Como**, and **Iseo**, on the Italian frontier.

GLACIERS.—The most extensive glaciers are the **Aletsch**, upon **Finsteraar Horn**, and the **Mer de Glace**, upon **Mont Blanc**, descending into the valley of **Chamonix**. These glaciers are of great advantage in keeping up a constant supply to the rivers. On or near **Mt. St. Gothard** rise the following rivers: the **Rhone**, **Vorder Rhine**, **Reuss**, flowing into the **Aar**, the **Aar**, the **Ticino**, and **Toce**. Thus **St. Gothard** forms the central mass of the **Swiss Alps**.

SWITZERLAND

POSITION AND BOUNDARIES.—Switzerland is a small country in the centre of Europe, having **Germany** on the north, **France** on the west, **Italy** on the south, and **Austria** on the east.

SIZE.—Area, nearly 16,000 sq. miles, or rather less than one-third of England.

Greatest length from east to west, 208 miles.

Greatest breadth from north to south, 156 miles.

RELIEF.—The surface of Switzerland is elevated, four-sevenths being occupied by the **Alps**, one-seventh by the **Jura**, and two-sevenths by the **Swiss Plateau**.

The **Jura Range** stretches from south-west to north-east, extending into both France and Switzerland, and the frontier runs through the Range. The **Alps** fill up the south, east, and north-east, and extend far into the centre. The outer or northern slope is almost parallel with the **Jura**.

Between the **Alps** and the **Jura** lies the **Swiss Plateau**, about 100 miles long and from 12 to 20 miles wide, and having an

average elevation of nearly 1,400 ft. Into this tableland stretch numerous outlying spurs both from the Alps and the Jura. The slope of both mountain systems is abrupt towards the south and long towards the north and west.

MOUNTAINS AND HEIGHTS.—In Switzerland the central point of the Alps is **Mt. St. Gothard**, from which the great ranges **Bernese** and **Pennine** Alps diverge to the south-west, and numerous other ranges radiate north, east, and south-east.

For full description see **The Alps**.

The **Jura Mountain** system consists of several parallel ranges in Switzerland and France, with an average height of between 3,000 and 4,000 ft. The highest summit is about 6,000 ft., and, therefore, below the snow-line.

The range is of limestone with rounded heights. As in all limestone formations, the rainfall disappears rapidly through numerous fissures in the higher districts, issuing in the lower valleys as steady and deep streams.

CLIMATE AND RAINFALL.—Owing to its general great elevation, the climate of Switzerland is severe in the winter, with enormous falls of snow, which either fill up the higher valleys, where great glaciers are formed, or descend as **avalanches**, sometimes very destructive to life and property. The greatest glacier is the **Aletsch**.

The summer is comparatively brief, and very hot and close in the lower valleys; while in the higher regions the air is clear and invigorating. The summer rainfall, and the melting of the snow and of the glaciers, cause the country to be well watered and the streams to be constantly full. The local causes which modify the climate are :—

1. The Alps in the south are so high as to exclude the mild southern winds, while the northern district is more open to the cold northern winds.

2. The country is not too far east to be out of the influence of the moist west winds.

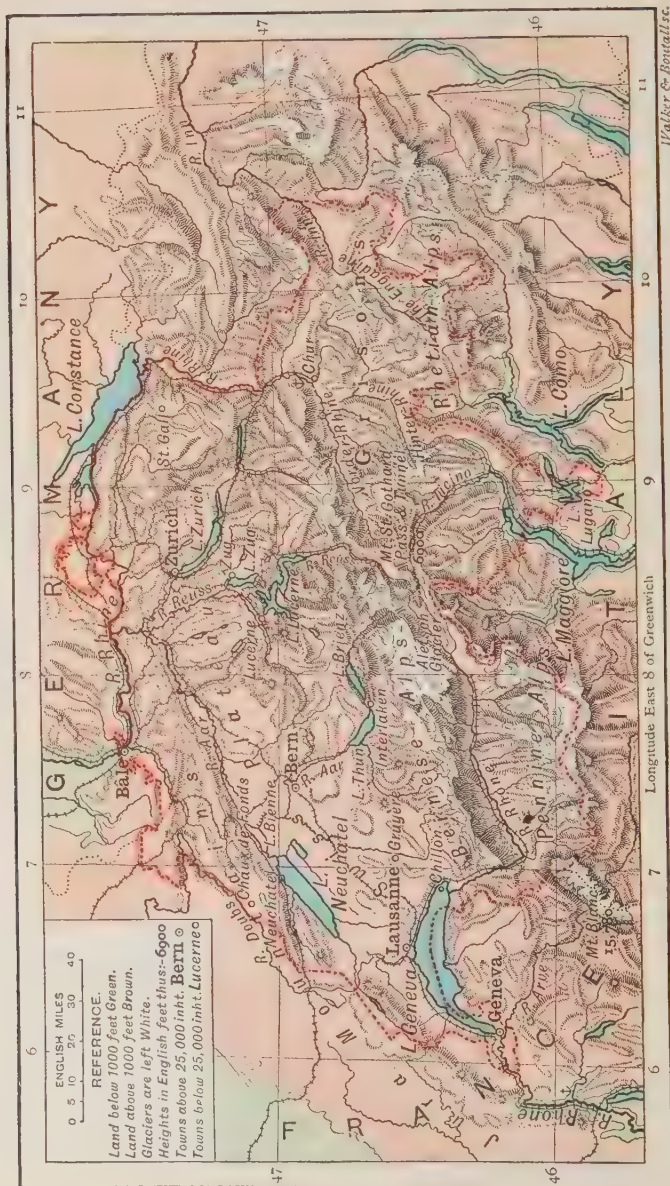
3. The depth and narrowness of the Alpine valleys cause the air to be confined, and the radiation from the mountain sides in summer produces the great heat of that season.

RIVERS.—Switzerland has the sources and upper courses of numerous rivers, but owing to the elevation they are generally unnavigable, with the exception of the Rhine from **Coire** (Chur) to Lake Constance, and the **Aar** from Lake Thun to its confluence with the Rhine.

Rivers rising in Mt. St. Gothard.—**Rhone**, **Rhine**, **Aar**, **Reuss**, and **Ticino**. The **Rhone** rises in Mt. St. Gothard, flows through the valley of **Valais** in a south-west direction to **Martigny**; thence north-west to **L. Geneva**, from which it issues, and is then joined by the **Arve** from **Mont Blanc**.

The **Rhine** is formed by the **Vorder Rhine**, rising in Mt. St. Gothard, and the **Hinter Rhine**. The **Aar** rises in the **Aletsch Glacier**, and after

FIG. 156.—SWITZERLAND.



passing through Lakes **Brien** and **Thun** sweeps round to the west towards **Lake Bi**enne, into which it is diverted to prevent flooding. It then flows north-east to its confluence, receiving the drainage of the Plateau. Near its confluence it receives the **Reuss**, which comes from Mt. **St. Gothard**, and flows through **Lake Lucerne**.

The **Ticino** rises in **St. Gothard**, and flows into **Lake Maggiore**.

The **Inn** rises in the **Rhætian Alps**, and flows through the valley called the **Engadine** into **Bavaria** and to the **Danube**.

FERTILITY OF SOIL.—Of the soil of Switzerland over one-quarter is unproductive, and slightly less than one-half under grass or forests, leaving one-quarter for cultivated land. Even on the Plateau the soil is not naturally very fertile, but by the industry of the people has been made to produce fair crops. The pastures of the Alps, properly so called, affords food for the herds and flocks in summer.

PRODUCTS. 1.—**Agricultural.**—The chief product of the soil is **hay**.

Rye, **oats** and **barley** are the chief crops but not sufficient grain is grown for home consumption.

Wine is produced and **tobacco** is grown in some parts of the country.

2. **Animal.**—The chief animals, in order of their number, are **cattle**, **pigs**, **goats**, **sheep**, and **horses**. There is a considerable annual import of all these animals except **goats**.

The chief animal products are **cheese** and **condensed milk**.

3. **Mineral.**—These are unimportant. There are no coal-mines, but small quantities of **iron**, **copper**, and **lead** are obtained.

MANUFACTURES.—Like **Holland**, **Switzerland** is a remarkable instance of a country possessing neither coal nor iron yet carrying on important manufactures. In **Holland** the winds are utilised as power for working machinery; in **Switzerland**, the water-power of the many rapid streams is applied to the same purpose to a greater degree than in any other country. The excellent system of technical education provided by the State has produced an abundance of cheap skilled labour, and has enabled the **Swiss** to compete with other manufacturing nations, even sending **cottons** to **England**.

The leading manufactures are **silk** and **cotton goods**, **butter**, **cheese**, &c., **machinery**, **woollen goods**.

Silk.—Spinning and weaving of **silk**, still largely done by hand, employ many people at **Zurich** and **Bâle**.

Cotton.—**Swiss cotton** yarns are noted for their fineness, and are produced chiefly at **Zurich** and the neighbouring districts.

Embroidery.—The canton of **St. Gall** is famous for the making of embroidery.

Watchmaking is carried on in the valleys of the **Swiss Jura**, where large establishments for the construction of machine-made watches are largely superseding the hand industry. **Geneva** is the chief centre of the trade in the watches which derive their name from that place. The chief cantons concerned in the industry are **Neuchatel** and **Bern**.

Cheese is widely made, but chiefly in **Gruyère**.

Wine is made on the warm slopes near **Geneva** and **Neuchatel**.

TRADE.—Being surrounded by populous countries, Switzerland formerly found a ready market for her products through the great passes, and now by the railways passing through the mountain tunnels Swiss cotton, silks, and watches are exported to the most distant countries—North and South America, Dutch East Indies, China, Australia, &c.

Imports.—Cereals, silk goods, cotton goods, woollen goods, ironwork, colonial produce (tea, coffee, &c.), machinery, timber, hides and skins.

Exports.—Silk goods, cotton goods, butter, cheese, &c., machinery, clocks, hides and skins, &c.

The imports are mostly from Germany, France, Italy, and Austria-Hungary.

The exports are mostly to Germany, Great Britain, United States, France, Italy, and Austria-Hungary.

MEANS OF INTERNAL COMMUNICATION.—Total length of Swiss railways, 3,170 miles. Chief railway centres: **Zurich**, **Geneva**, and **Bâle**. Rivers and canals play an unimportant part in commerce. Roads are good. Toothed railways have been constructed upon several of the mountains, the most familiar being that on **The Rigi**.

DISTRICTS AND TOWNS.—The cantons are 25 in number, and vary in size from **Grisons**, 2,773 sq. miles (the size of Lincoln), to **Basel-Stadt** (14 sq. miles). The district north-west of a line drawn from **Geneva** through **Chillon**, at the east end of Lake Geneva, and **St. Gall**, near the east end of Lake Constance, includes the most populous cantons and all the chief towns. The chief towns are:—

Geneva (135), on Lake Geneva, where the Rhone issues; a well-situated and well-built city with important manufactures, educational institutions, and interesting historical associations, having long been the resort of political exiles and the home of famous men, notably **Calvin** and **Rousseau**.

Bern (104) is the capital of the republic, and an important centre of internal trade.

Zurich (207) with its extensive suburbs, the intellectual and commercial centre of German Switzerland, and famous for its Technical School.

Bâle, or **Basel** (136), at northern bend of the Rhine; an ancient town with silk manufacture and much foreign trade.

Chaux-de-Fonds, **St. Gall**, and **Neuchatel** are all manufacturing towns.

Lucerne, **Zermatt**, and **Interlaken** are places of resort for tourists and centres for excursions.

Lausanne (68), on the north of Lake Geneva, the centre of the Supreme Law Courts, and famous as the residence of Gibbon whilst writing the 'Decline and Fall of the Roman Empire.'

POPULATION.—3,880,000 or 243 to a sq. mile. The majority of the people live on the Plateau, which is only two-sevenths of the surface.

THE PEOPLE.—The Swiss are of two distinct races—**Teutonic** and **Latin**. The Teutonic race is represented by **Germans**, who make up two-thirds of the total, and occupy the north, east, and centre. German is spoken in these parts, and is the official language of the Government.

The Latin peoples, **French** and **Italians**, occupy the south and south-west. The Engadine, or valley of the Upper Inn, is inhabited by a race of people who speak **Roumansch**, a dialect of the Latin.

ARMY.—Compulsory service provides a considerable army, each able-bodied man being required to belong to either the Federal army or the different sections of the militia (the Landwehr and Landsturm), and to undergo certain periods of training, but there is no standing army of paid soldiers. The effective strength of the Swiss army is over 500,000 men.

DEFENCES.—Fortresses are now being erected for the defence of various strategic points, such as the points where the great railways cross the frontier.

EXAMINATION PAPERS

- A. 1. Name the great divisions, chief ranges, and highest peaks of the Alps.
2. Show the influence of the Alpine system upon the rivers of Europe.
3. What is meant by the terms Fore Alps and Alps? Indicate the position and name the chief glaciers.
4. Write an account of the height, position, and usefulness of the Alpine passes, and name six.
- B. 1. What do you know of the position and height of Mt. Blanc, St. Gothard, The Rigi, Jungfrau, The Matterhorn, Cenis, Monte Rosa, and Ortzler Spitze?
2. Name the rivers rising in Mt. St. Gothard, and indicate their direction.
3. Describe the relief of Switzerland.
4. Give an account of the industries of Switzerland.
- C. 1. Describe the climate of Switzerland, and name the local causes affecting it.
2. Where and what are The Engadine, The Rigi, Interlaken, Zermatt, Bâle, Valais, Grisons?
3. Show the influence of tunnels through the Alps upon Swiss trade.
4. What natural advantages and disadvantages does Switzerland possess for the growth of manufactures?

AUSTRIA

GENERAL DESCRIPTION.—As a result of the Great War the Austrian Empire was broken up and other States were carved out of her territories. Hungary broke away and is now an independent country. The eastern part of Austria lies in the upper Danube valley and contains much fertile soil. The western part is mountainous and the country rises to the Tyrol mountains.

BOUNDARIES.—North. Germany on the north-west. Czecho-Slovakia on the north-east; Hungary on the east; Yugoslavia and Italy on the south; Switzerland on the west.

SIZE.—Only about one-sixth of the old Austrian Empire, and its area is about 40,000 sq. miles, or about a third of the British Isles.

RELIEF.—The general slope of the land is from the mountains in the south and west to the Danube valley in the north and east. The country is very mountainous in the west where the highest peaks of the Noric Alps reach an elevation of over 12,000 feet.

MOUNTAINS.—The Western Mountain Region is a continuation of the Alpine system of Switzerland. The Rhætian Alps pass from Switzerland into the Austrian Tyrol, and are continued eastward into the Noric Alps, from which spurs stretch to the Danube between Vienna and Pressburg. The highest part of the Noric Alps is the Hohe Tauern, of which the chief peak is Gross Glockner (12,450 ft.). Forming the boundary between Italy and Austria are the Dolomites and the Carnic Alps. The latter are continued in a south-east direction by the Julian Alps.

CLIMATE AND RAINFALL.—Owing to the great differences in the elevation of different parts of the country there is considerable variation of climate, but generally speaking the winters are cold and the summers are warm: the winter isotherms range between 6° and 32°, whereas the summer isotherms lie between 70° and 80°. (See Maps on pp. 94 and 95.)

The heat of summer is accounted for by:—

1. The Latitude from about 46° to 49° north.
2. The country is near enough to the Mediterranean and Northern Africa to come under the influence of the hot southerly winds.

The severity of the winter is caused by:—

1. The cold winds from the east and north find an easy entrance along the valleys of the Danube and its tributaries.
2. The elevation of a large part of the country.

FIG. 157.—SOUTHERN CENTRAL EUROPE: PHYSICAL AND POLITICAL.



RAINFALL.—There is a heavy rainfall in the mountainous regions of the west, over 80 in. a year, and the lower lands of the river valleys also receive an abundant supply for agriculture. (See Map on p. 96.)

RIVERS.—The **R. Danube** flows across the northern part of the country and its tributaries drain the western and southern mountain slopes. All the important towns are to be found on these rivers.

The **Danube**, with a length of 1,700 miles and a basin 300,000 sq. miles, is exceeded in size by only one river in Europe—viz., the Volga. It rises in the **Black Forest**, in Germany, and flowing generally east with a great bend at **Waitzen**, in Hungary, enters the Black Sea. This river is navigable through a great part of its course, but is narrowed by the near approach of mountains at various points, and the continuous navigation is impeded by the rapids thus formed. The Danube is generally a deep and wide stream, and is subject to floodings in the plains of Hungary, where extensive permanent marshes lie on both sides. The most striking part of the course is known as the **Iron Gate**, where the Carpathians approach the offshoots of the Balkans.

FERTILITY OF THE SOIL.—Generally speaking, the soil is fertile in the river valleys, particularly so in the Danube valley. The Alpine regions of the Tyrol contain the largest proportion of quite unproductive surface.

PRODUCTS.—1. Agricultural. 1. Cereals, rye, oats, wheat, and maize.

2. Potatoes, sugar-beet, and hops.

3. The vine is grown on the sunny hill slopes of the Alpine regions; silk is also produced.

4. The cultivation of timber is fostered by the Government, and forests are grown on the slopes of the Alps.

2. **Animal.**—Cattle, sheep, pigs and goats.

In the great forests a considerable number of wild animals still exist and are preserved for hunting.

3. **Mineral.**—Parts of the country are rich in minerals. Coal, iron, salt, silver, and mercury are found. Most of the minerals are found in the mountain regions of the South-West.

MANUFACTURES.—Most of the coal-producing and therefore manufacturing parts of the country, *e.g.*, Bohemia and Moravia, now form part of the new Czecho-Slovakia State, but many kinds of manufactured goods are produced in some of the larger cities and towns. **Vienna** produces a variety of goods such as silks, porcelain, fancy goods in leather, glass, &c., and machinery. **Steyr** and **Gratz**, iron manufactures.

TRADE.—Austrian trade is mostly with neighbouring countries. The loss of her coast line and her shipping cut her off from direct dealings with the distant markets, but Austrian goods find their way to Adriatic ports and thence to the Far East.

The trade of Austria is small compared with most European countries. This is accounted for by :—

(a) The rude methods of agriculture, which have caused the crops to be relatively small. An improvement is now taking place.

(b) The simple needs of the people, many of whom wear clothing of rough make but very lasting wear.

(c) Internal communications are not very good, and the country suffers from lack of coast line.

RAILWAYS are fairly numerous and convenient in the Danube valley in the northern part of the country. Vienna is connected by rail with Berlin, Munich, Venice, Trieste, Constantinople and with all other important towns in adjacent countries.

IMPORTS.—Grain, flour, and rice; coal and fuel; wines; building material; iron goods; textiles and rubber.

EXPORTS.—Timber: ores, paper goods, chemicals, sugar-beet, furniture, &c.

SEAPORTS.—Austria has lost her seaports, but the Peace Treaty provides for free access to Fiume.

POPULATION.—The bulk of the people are Germans and number about $6\frac{1}{2}$ millions.

TOWNS.

Vienna (1,841), upon the Danube, in lower Austria, is the largest city and the capital of the empire. It is a great trade centre, both by the Danube and by rail to Italy and also Northern Europe, and the chief manufacturing city. It resembles Paris in carrying on a great variety of manufactures, embracing silks, machinery, porcelain, jewellery, and fancy wares of all description. Vienna is a handsome city, with fine wide streets and many beautiful buildings. The climate is unpleasant, being very cold in winter and correspondingly hot in summer. The city has a University and many other educational establishments, and is also famous for its art galleries and schools. Vienna, like Berlin, is an undefended city.

Gratz (157), in Styria, upon the R. Mur, is the largest town in the Alpine Provinces. It is the centre of a large internal trade, and has iron and steel manufactures.

Lenz (94,000). A manufacturing town on the River Danube.

EXAMINATION PAPERS.

- A. 1. What territories were lost by Austria-Hungary as a result of the Great War?
2. Give the boundaries of Austria.
3. Say what you can about the general surface of the country.
4. By what means are goods conveyed from one part of the country to another?

- B. 1. How do you account for the extremes of heat and cold?
 2. What does Austria buy and sell from other countries?
 3. What kind of goods can Vienna sell to London?
 4. Say what you can about the chief crops and how they are disposed of.
- C. 1. Draw a sketch map to show the territory lost by Austria in the Great War.
 2. Draw a sketch map to show railway connections of Venice with Paris, Berlin, Petrograd, and Constantinople.
 3. Examine maps on pp. 94 and 95, and point out the summer and winter extremes of temperature.

HUNGARY

Hungary was separated from Austria at the close of the Great War and is now an independent State. The Peace Treaty gave Transylvania to Rumania, and other territories in the south were transferred to the new State of Yugo-Slavia. Hungary is a large plain through which the Danube flows and is surrounded by mountainous country, the general slope being towards the great river valley. The most striking feature is the wide stretch of almost level plains called the **Pusztas**, a fertile country devoted to agriculture and the raising of horses and cattle. The climate ranges from extreme summer heat to intense cold in the winter. The people are **Magyars**.

BOUNDARIES. — North. — Czecho-Slovakia. East. — Rumania. South.—Yugo-Slavia. West.—Austria. The only natural boundary is in the south where for some distance it follows the course of the R. Drave.

SIZE.—Area about 36,000 sq. miles.

RELIEF.—The country is a great plain with here and there low ranges of hills; the general slope of the land is towards the valley of the R. Danube that flows through the middle of the country.

PLAINS.—The Plain of Hungary extends for many miles on each side of the Danube, and is generally level, and subject near the rivers to floods. The level stretches of country watered by the **Theiss** are called the **Pusztas**. These suffer from extremes of heat in summer and cold in winter.

CLIMATE AND RAINFALL.—A study of the maps on pp. 94 and 95 will show the extreme range of the climate. The great heat of the summer is due to the southern latitude and the mountains to the north and east which act as a barrier to the passage of cool winds. The rainfall is scanty on the Pusztas and irrigation is common.

Local causes modifying the climate of Hungary are :—

1. The mountains of the north-east do not offer sufficient barrier against the cold winds from Russia.
2. The country is but little influenced by the ocean.
3. The warm winds from Africa are not prevented by the southern mountains from blowing over most of the country.
4. The elevation of the northern part of the country causes the winters of the mountain and plateau regions to be severe.

RIVERS.—The **R. Danube** and its tributaries, the **R. Theiss** and the numerous streams that flow into it; the **Mur** and the **Leitha**.

The **R. Danube** has a total length of 1,700 m. and for several hundred miles of its middle course it flows through the heart of Hungary. It is navigable for the whole of the distance. Below **Buda-Pesth** it flows through low swampy country and hence no towns of any size are to be found below that city. The importance of the river is shown by the fact that all the chief towns are situated either on the main stream or on its tributaries.

LAKES.—There are many small lakes in the plains. The only large one is **L. Balaton**.

FERTILITY OF SOIL.—Generally speaking the soil of Hungary is fertile, especially in the river valleys. The Pusztas are mainly grazing lands, but grain and other crops are also grown in districts where the land is irrigated.

PRODUCTS.—**Agricultural.**—Hungary is essentially an agricultural country, but methods are backward. The chief crops are:—Rye, oats, wheat and maize; potatoes, sugar-beet and hops.

Hungary produces a very hard wheat from which the finest flour is made.

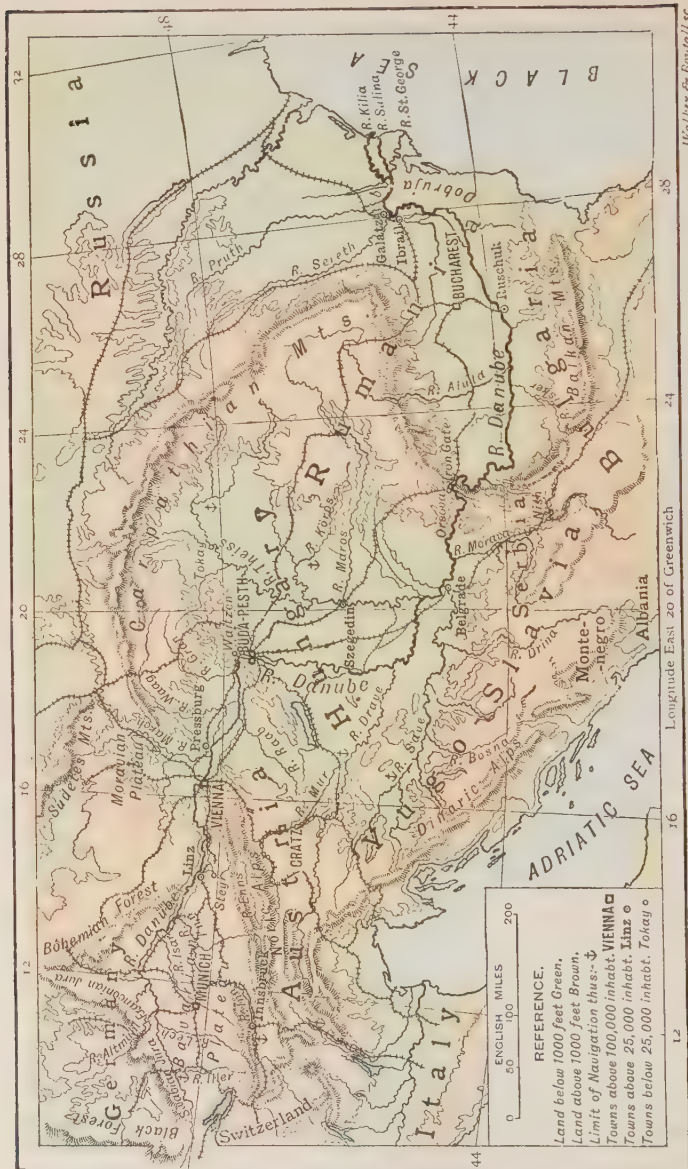
Animals.—Cattle, sheep, pigs, goats and large herds of horses are reared on the plains.

Silk-culture and bee-keeping employ a large number of people.

MINERAL.—Hungary is not rich in mineral wealth, though lignite, coal, iron and gold are produced.

MANUFACTURES.—There are no great manufactures, but about 12 per cent. of the people are employed in the various

FIG. 158.—THE RIVER DANUBE.



industries, such as the making of clothes, brewing, distilling, the making of earthenware and glass, tobacco and sugar factories, paper-making, etc.

The chief manufacturing town is **Buda-Pesth**, on the R. Danube.

TRADE.—Trade is almost confined to an interchange of goods with Austria and other neighbouring countries. Some of the leading exports are grain, flour, cattle, pigs, wine, sugar and wood, which Hungary exchanges for cotton, machinery, woollens, iron-ware, prepared leather, coal, etc.

MEANS OF COMMUNICATION.—Large areas are remote from railways, but goods and passengers are carried along the rivers. The Danube is the great waterway and there are over 2,000 miles of river navigable for steam-boats. Rafts are used for the conveyance of timber. Buda-Pesth is a great railway centre and is connected directly with Vienna, Trieste, and Constantinople.

TOWNS.—**Buda-Pesth** (1,180), upon the Danube, Buda being on the right and Pesth on the left bank. Buda is an old German town, while Pesth, a Magyar town, has a very different appearance. Fine bridges connect the two towns, which are great centres of trade and the chief seat of manufactures in Hungary, the most important being silk, velvet, and flour.

Other considerable towns are **Szegedin** on the Theiss, from the rising of which it is protected by embankments. **Debreczin** in the Pusztas and **Temesvar** in Banat.

POPULATION.—About 8 millions (1921) or 220 to the sq. mile. The people are mostly Magyars.

EXAMINATION PAPERS

- A. 1. Give the position of Hungary and name the various State that adjoin it.
2. What are the Pusztas? How are the people employed who live on them?
3. What kinds of goods could Buda-Pesth send to England?
4. What goods would England send in return?

- B. 1. The country has great extremes of heat and cold. Explain the reasons.
2. Look at the maps on pp. 94-5 and note winter and summer temperatures.
3. Look at the map on p. 96 and say what the annual rainfall would be. Note any difference between the east and west of the country.
4. Describe the waterways and railway communications with foreign countries.
-

CZECHO-SLOVAKIA

GENERAL DESCRIPTION.—This country, inhabited by Slav people, was formed at the termination of the Great War. Most of its territory belonged to the former Austrian Empire, that broke into pieces as a consequence of the war. It consists of Bohemia, Moravia, Slovakia, Silesia, and Ruthenia.

BOUNDARIES.—In the **west**, by the Erzgebirge Mts. and Böhmer Wald; in the **south**, by Austria and Hungary; in the **north** and **east** it is separated from Russia and Poland by the Carpathian Mountains.

AREA.—About 140,000 sq. miles.

POPULATION.—About $13\frac{1}{2}$ millions (1921), about 250 to the sq. mile.

POLITICAL FEATURES.—The country is peopled, as implied by its name, by the Czechs and Slovaks. The country is rich in minerals such as coal and iron, and has large manufacturing industries.

Czecho-Slovakia is one of the richest parts of Europe both as regards natural resources and manufacturing industries.

AGRICULTURE.—Excellent sugar-beet is grown and is the basis of a great sugar industry. Bohemia produces great quantities of hops, and Pilsener beer is largely exported.

Other crops are wheat and potatoes. Apples, pears, and plums are grown and exported.

MANUFACTURES.—There are many kinds of manufactures, the principal being glass, textiles, furniture, paper, chemicals, machinery, and other metal goods.

COMMERCE.—Exports.—Sugar, malt, fruit, beer, timber, coal, iron goods, chemicals, paper, and glass.

Imports.—Grain: raw materials for manufacture such as wool, cotton, and chemicals.

The capital, **Prague**, in Bohemia, upon the R. **Moldau**, where navigation commences, is situated at the meeting of important trade routes, and is the centre of the greatest manufacturing district in the empire. Prague is a very ancient city, with a celebrated University, and has many interesting historical associations, the chief being the battle of the White Hill in 1620, where Tilly defeated the forces of the Elector Palatine, and compelled his flight; and also the great victory of Frederick the Great over the Austrians in 1757. Population (676).

Brünn (220) is also a town of considerable importance.

Pilsen (88), famous for its breweries.

Pressburg (Bratislava), an important town, and the seat of a University.

EXAMINATION PAPER

1. Draw a sketch map of Czecho-Slovakia and show adjoining countries.
2. What provinces does Czecho-Slovakia consist of?
3. What articles are manufactured?
4. What goods can Czecho-Slovakia sell to Germany and to England?

YUGO-SLAVIA

GENERAL DESCRIPTION.—This country was formed out of a southern part of the former Austrian Empire, consisting of the States of **Bosnia** and **Herzegovina**, together with **Serbia** and **Montenegro**. It touches Austria and Hungary on the north, and is bounded by the Adriatic Sea on the south. The capital is **Zagreb** (79) (also known as **Agram**), a university city on the River **Sava**. The mountainous part of the country, especially the north-west, is rich in minerals, the principal products being **coal**, **iron**, **quicksilver**, and **salt**.

AREA.—About 96,000 sq. miles.

POPULATION.—About 12 millions.

The plain-lands of Yugo-Slavia are fertile, and watered by many streams flowing into the Save. The chief vegetable products are **timber** (forests cover a large part of the surface), **maize**, **wheat**, **plums** (dried for export), and **grapes**. **Sarajevo** is the second town in point of importance.

Belgrade (120), the chief town of Serbia, is the centre of an agricultural district at the confluence of the Save and Danube.

EXAMINATION PAPER

1. What old States are comprised in Yugo-Slavia?
2. Draw a sketch map showing adjoining countries.
3. What States were taken from Austria to form part of Yugo-Slavia?
4. What articles of commerce can the new State send to other countries?

BOSNIA, HERZEGOVINA AND NOVIBAZAR

These three States now form part of the new State of Yugo-Slavia.

BOUNDARIES.—Bosnia lies to the south of the **Save**, west of the **Drina**, and east of **Dalmatia**.

Herzegovina is in the angle formed by **Dalmatia** in the south-west and **Montenegro** and **Novibazar** in the south-east.

Novibazar lies between **Montenegro** and **Servia**.

AREA.—19,700 sq. miles.

PHYSICAL FEATURES.—These provinces consist of mountainous country, with many ranges parallel to the **Dinaric Alps**, separated by fertile valleys. The drainage is mainly to the north into the **Save**, the chief streams being the **Bosna** and **Drina**.

PRODUCTS.—**Minerals** are abundant and **Mining** is carried on mainly by the Government. Chief: **Iron**, **copper**, **salt**, and **chromium**.

Animal.—**Horses**, **cattle**, **sheep**, **goats**, and **pigs**, in large numbers.

Vegetable.—Forests cover nearly one-half of the surface, affording valuable timber. The soil is fertile, but agriculture is backward. **Maize**, **wheat**, and other cereals, **flax** and **hemp**, **tobacco**, **vine**, and **plums** are produced.

COMMERCE.—**Imports.**—Food stuffs and machinery.

Exports.—Animals and their products, dried plums, staves.

PEOPLE.—Serbians (Greek Church and Roman Catholics), Turks (Muhammadans), a few Jews and Gypsies; making a total of about 1,900,000.

FIG. 159.—YUGO-SLAVIA.



Emery Walker Ltd. sc.

Longmans & Co. London & New York

CHIEF TOWNS.—Sarajevo (50), the capital of Bosnia and the centre of trade; once a much larger town.

Mostar (14), capital of Herzegovina.

Novibazar, chief town of Novibazar.

POLAND

GENERAL DESCRIPTION.—The country of Poland has been restored to its former position of independence as a result of the war. It is now an independent Republic. Polish territory has been detached from Russia, Germany, and Austria for this purpose, and the new State has an area of about 146,800 sq. m. with a population of about 27 millions (1921).

BOUNDARIES.—East.—Russia. North.—Germany and the Baltic Sea. West.—Germany. South.—Czecho-Slovakia and Ukraina.

RELIEF.—Poland forms part of the Northern Plain of Europe. The country is generally flat with low hills in the south.

RIVERS.—The Vistula is the largest river; it flows through the heart of the country, and being sluggish, provides an easy passage for ships and barges carrying passengers and goods.

PRODUCTS.—Agricultural.—The soil is fertile and a great variety of crops are raised, such as rye, oats, wheat, barley, potatoes, and sugar-beet. Stock-raising (cattle, sheep, horses and pigs) is an important industry. About a quarter of the area is forest land.

Mineral.—Coal, zinc, salt, and potash are the chief minerals; there are also productive oil fields in the south.

Manufactures.—Cotton, woollen and leather goods, also machinery and chemicals. There are also a large number of sugar refineries and distilleries.

TRADE.—Poland trades chiefly with neighbouring countries. She exports agricultural produce and textiles, and imports raw materials for manufacture, such as cotton and wool. Access to the Baltic is obtained through the seaport of Danzig.

TOWNS.—Warsaw.—One of the oldest and most famous cities of Europe. It has a population of about a million. The city is situated on the R. Vistula, which has several fine bridges. It is the seat of large and important textile and other factories. It contains a great University and many fine buildings.

Lodz (450,000), the centre of a great cotton and linen industry. Cracow (180,000) and Posen (170,000) are centres of manufacture and trade.

Free City of Danzig.—Danzig, with the surrounding country, is a free city protected by the League of Nations. Its area is about 750 sq. m., and the population of the city is 365,000 (1923).

It has a large trade in forest and agricultural products (sugar, timber, and grain being the chief articles of export), and is an outlet for the exports and imports of Poland.

EXAMINATION PAPERS

- A. 1. What countries adjoin (a) Poland. (b) Czecho Slovakia. (c) Yugo-Slavia?
2. Describe the surface of Czecho-Slovakia.
3. Why have cotton and other manufactures sprung up in Poland?
4. How is merchandise conveyed in each of these countries?
- B. 1. What are the chief products of Czecho-Slovakia?
2. What access to the sea have Czecho-Slovakia, Poland and Yugo-Slavia?
3. What are the chief employments of the Jugo-Slovaks?
4. Where and what are Prague, Zagreb, Warsaw, Lenz, Danzig and Fiume?

RUSSIA

POSITION AND BOUNDARIES.—Russia occupies the greater part of the Great European Plain, which stretches from the Netherlands to the Ural Mountains, and which to the east of the Carpathians widens out so as to fill the space between the Black Sea and the Arctic Ocean.

The natural boundaries are: **On the north, Arctic Ocean**; south, **Black and Caspian Seas** and a tributary of the river Kur; east, the **Ural Mountains** for a long distance; west, **Baltic Sea and Poland**.

The remaining boundaries are mostly arbitrary lines.

SIZE.—AREA.—**European Russia**, about $1\frac{1}{2}$ million sq. miles. **Asiatic Russia**, over 6,600,000 sq. miles, giving total area of the Russian Empire of over 8 millions of sq. miles as compared with $12\frac{3}{4}$ million sq. miles of the British Empire.

Greatest length and breadth each about 1,800 miles.

RELIEF.—Almost the entire surface of Russia is a plain of low elevation, the highest point being reached in the **Valdai Hills** (1,200 ft.), which rise very gradually from the plain. In the **south-east** is a large district below the sea level lying north and west of the Caspian Sea. The southern half of the **Ural Mountain System** falls within European Russia; and the **Caucasus** in the south-east are within the political boundary, although not generally considered to form part of Europe. **Finland** forms a plateau of low elevation, and there is another low plateau in the south-east, drained by the **Dniester, Bug, and Dnieper**. The chief watershed is the **Valdai Hills**, which form a plateau from which numerous great rivers flow into the Baltic, Caspian, and Black Seas.

A very slightly elevated region, immediately to the east of the Valdai Hills, stretches across the country towards the Ural Mountains, and forms the watershed between the Arctic streams and the tributaries of the Volga.

MOUNTAINS.—The **Caucasus Mountains** form a very high and steep range between the Black and Caspian Seas. The highest peaks are **Elburz** (18,500 ft.) and **Kasbeck** (16,500 ft.). The range is about 700 miles long and 150 miles wide. The slope is very sudden and steep towards the north, but gradual towards the south. This range, unlike the Alps, has very few passes, the chief being the **Dariel Road**, which is through a defile 120 miles long, with rocks of vast height on either side.

The Caucasus Mountain system is interrupted at the Strait of Kertch, but reappears in the **Crimea** in the range called **Chatyr Dag**.

Ural Mountains.—This chain is very long (1,200 miles) and narrow, but not of a very mountainous character. The eastern and western slopes are extremely gradual and generally present little obstruction to traffic. The highest point is **Tolpos-Iz** (5,500 ft.), but the average height of the chief ridge is under 3,000 ft.

COASTS.—The coasts are generally indented, but all suffer from the great disadvantage of being frozen, for periods varying from an average of 188 days per annum at **Archangel**, 129 days at **Riga**, and 101 days at **Astrakhan**, to 77 days at **Odessa**. Only the southern shores of the Black Sea are always free. The **Baltic** and **Azof** Seas also are shallow, and the **Caspian Sea** is a lake lying 84 ft. below the level of the Black Sea.

SEAS AND PARTS OF SEAS.—The **White Sea** is a portion of the Arctic Ocean with several arms, of which **Onega Bay** receives the **R. Onega**.

Baltic Sea.—The chief parts are the Gulfs of **Bothnia**, **Finland**, and **Riga**.

The **Baltic Sea** is 135,000 sq. miles in area. Its waters are shallow and brackish, and there are no tides. It is partially frozen every winter, and sometimes completely.

The **Black Sea** is connected with the Sea of **Azof** by the Strait of **Kertch**.

Area of **Black Sea**, 180,000 sq. miles. It is deep in the centre and west, but shallow in the north. The water is less salt than the Mediterranean, but saltier than the Baltic. It has no tide.

The **Caspian Sea** is 170,000 sq. miles in extent. The water is very deep in the centre; it is salt and of diminishing area.

ISLANDS.—In the Arctic Ocean: **Kolguef**, **Vaigach**, and **Nova** (or **Novaya**) **Zembla**. The latter is very large. All these islands are very cold and bare.

In the Baltic: The **Aland Group**, **Dago**, and **Æsel**.

FIG. 160.—RUSSIA.



CLIMATE AND RAINFALL.—Notwithstanding its great extent from north to south, Russia has much similarity throughout in climate, considering that the country extends over 30° of latitude. This is due to the flatness of the country. Compared with Western Europe, the extremes of heat and cold are far greater and the rainfall less. The greatest extremes of temperature are felt in the south-east, south of a line from Odessa through Saratof to Orenburg; and in this district the rainfall is least. The dryness of the atmosphere causes the cold to be borne with comparative ease.

Local causes which modify the climate of Russia:—

1. Russia is too far east to feel the moderating influence of the Atlantic, or to receive much rain from the west.

2. The Ural Mountain system offers little barrier to the winds from Asia, whether hot or cold.

3. The absence of high land in the north causes the Arctic winds to have free play over the Great Plain.

4. The height of the Caucasus and of the land further south acts as a hindrance to southerly winds from the Indian Ocean.

Comparison.—Winter temperature at Astrakhan, 20° lower than that of London. Summer temperature at Astrakhan, 14° higher than that of London. Winter temperature at Archangel, 10° lower than at Astrakhan. Summer temperature at Archangel equal to that of the North of England, though 10° of latitude further north.

A glance at the map of Europe showing Isotherms on pp. 94 and 95 will show that the whole of Russia, except the extreme north, has a higher temperature in the summer than the British Isles; but in winter the temperature is much lower, nearly the whole of the country being in the winter range of 0° to 32° , and in the extreme north-east the winter temperature is below zero. It is interesting to compare the great range of the winter isotherm of 32° with the summer isotherm of 70° .

RIVERS.—The rivers of Russia form its most striking natural feature, being very numerous and of great length. They mostly rise near the centre and flow outwards towards the Arctic, Baltic, Black and Caspian Seas, thus forming four groups—

(a) Rivers flowing into the Arctic Ocean: **Petchora** (900 miles long), **Northern Dwina** (over 700 miles), and **Onega**.

(b) Rivers flowing into the Baltic Sea: **Neva**, a short but important stream, **Western Dwina** (550 miles).

(c) Rivers flowing into the Black Sea; **Pruth**, a tributary of the Danube, forming the boundary between Rumania and Russia; **Dniester** (700 miles), **Bug**, and **Dnieper** (1,200 miles). The **Don** (1,100 miles), flowing into the Sea of Azof.

(d) Rivers flowing into the Caspian Sea : **Volga** (2,200 miles), **Ural** (1,150 miles), **Terek**, and **Kur**.

Advantages of Russian rivers:—

1. The slope of the country being so slight, their currents are slow, and so they afford a ready means of navigation into and from all parts of the country.

2. They are easily connected by canals, and so a great network of water-way is possible.

Disadvantages of Russian rivers:—

General.—1. They are all blocked with ice in winter for greater or less periods.

2. The scanty rainfall causes their volume to be much diminished in the height of summer.

3. From the lowness of the banks they are liable to severe floods at the melting of the snow.

Particulars.—1. The rivers of the **Arctic Slope** flow through barren and thinly-peopled regions, and are of small use.

2. The **Dniester**, **Bug**, and **Dnieper** are all impeded by rapids where they descend from a plateau to the plain.

3. The **Don** flows through a very dry region, and is shallow through having very few feeders.

4. The **Neva** is obstructed by rapids.

5. The **Volga** and **Ural** end in the Caspian, an inland sea. Hence all goods coming down the Volga for foreign destinations have to be transhipped at **Tsaritsin** and carried by rail to the Don.

The **Volga** (2,200 miles long) has the longest course and greatest basin of all European rivers. It rises in the **Valdai Hills**, and after a winding course, first east and then south, flows into the Caspian Sea by about sixty mouths. The chief tributaries are the **Kama**, which comes down from the Ural Mountains and has a basin larger than France, and the **Oka**, which drains the most fertile part of Russia. The chief towns on its banks are **Tver**, where navigation, for any except the lightest vessels, ceases; **Nijni** (**Nizhnei**) **Novgorod**, at the confluence of the Oka, famous for the great fairs, where two continents exchange their products; **Kazan**, a centre for trade with Asia, and famous for its University (it is distinctly an Eastern city, with numerous Muhammadans); **Samara** and **Saratof**, centres of trade from Moscow through Orenburg to Asia, and the latter also a manufacturing town; **Tsaritsin**, where goods are transhipped and carried by the Don to the Sea of Azof; **Astrakhan**, on the Delta, an important manufacturing and commercial town; **Moscow**, on the Moskwa, a tributary of the Oka, the ancient capital of Russia. It now has important manufactures of woollen, silk, and linen goods, and most extensive trade.

LAKES.—The lakes on the Plateau of Finland and in the plain immediately to the east of Finland form the most extensive system in Europe. Lakes **Ladoga** (about 6,800 sq. miles) and **Onega** (3,300 sq. miles) are in the plain, and are very deep lakes. Lake **Saima** and numerous other lakes are on the Plateau of Finland. Lakes **Ilmen** and **Peipus** are shallow lakes south of the Gulf of Finland. There are numerous small salt lakes in the depression north of the Caspian Sea.

FERTILITY OF SOIL.—The surface of Russia may be divided into five zones of production from north to south—viz. the **Toundras**, the **Forest Zone**, the **Industrial Zone**, the **Agricultural Zone**, and the **Steppes**.

FIG. 161.—THE BALTIC SEA.



Walker & Boutall sc.

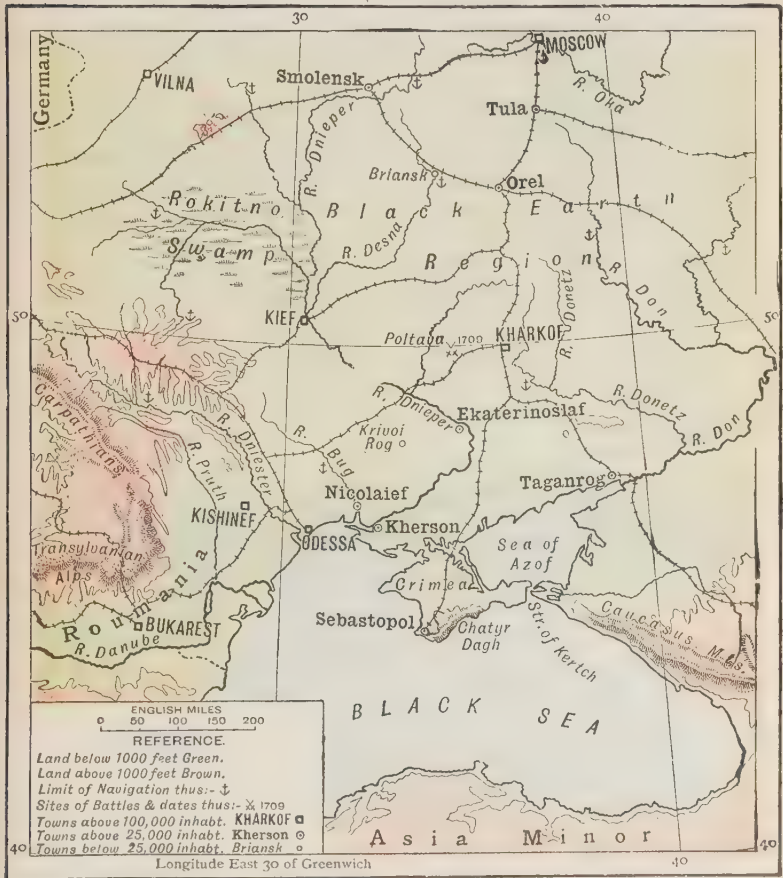
Longmans & Co. London & New York.

1. The **Toundras** are the bleak plains bordering on the Arctic Ocean, and lie mostly within the Arctic Circle. The surface

thaws only to the depth of a foot in summer, and is inhabited by a few wandering **Lapps** and **Samoyedes**, with herds of reindeer, which feed on the abundant moss.

2. The **Forest Zone** is bounded on the south by a line running generally south-east from St. Petersburg. About one-third

FIG. 162.—RIVERS OF SOUTHERN RUSSIA.



Longmans & Co. London & New York.

of Russia is covered with forests. The products are timber, resin, potash, and tar, and the furs of sable, ermine, bears, &c.

3. The **Industrial Zone** is in the heart of Russia, where many important manufactures are carried on; but the agricultural

products are insufficient for the population, although the soil is well cultivated.

4. The **Agricultural Zone**, south of the Industrial Zone. The southern portion, from the Pruth to the Volga, is called the **Black Earth Region**. This black soil is very deep and remarkably fertile. The products far exceed the needs of the population, and leave a large surplus for internal exchange and foreign export. This region resembles the Hungarian Pushtas in its lack of trees. Where the rainfall is sufficient great quantities of wheat are produced.

5. The **Steppes** in the south and south-east are barren, and are inhabited by Tartars and Kalmucks, nomadic people, who wander over the plains with flocks and herds as do the tribes of Central Asia. To the north and west of the Caspian Sea are salt swamps, and numerous salt lakes occupy a district below the level of the Black Sea.

PRODUCTS.—1. **Agricultural.**—About two-fifths of the soil of Russia is arable or pasture land, and about two-fifths is forest land.

Till 1861 the Russian peasantry were serfs and the property of the landowners. Since their emancipation about a third of the country has been transferred to the peasants. The modes of cultivation are generally rude, but better methods are used in Poland. Russia is second amongst European countries in wheat production, France being first.

In order of quantity the chief crops are **potatoes, rye, oats, wheat, barley, millet, flax, hemp, sugar-beet, wine, and tobacco.**

Rye is grown in great quantities for home consumption, being the staple food of the people. More than twice as much rye is produced as of wheat. Wheat is largely exported. **Flax** and **hemp** are on the increase, while diminishing in other European countries.

2. **Mineral.**—Russia has vast mineral resources, which are being worked in increasing quantities. The chief are **coal, iron, gold, platinum, silver, zinc, copper, mercury, salt, and petroleum.** Manganese is also worked.

Coal measures extend over a great area, chiefly in four districts:—

1. In the **Donetz Valley**. This is the largest, with a rapidly increasing output of coal, having nearly doubled between 1884 and 1890.

2. To the south and west of **Moscow**, near **Kaluga** and **Tula**.

3. A coal-field to the north of **Perm** and west of the **Urals**.

Iron-ores are found on the three first-named, and at **Krivoi Rog**, north of **Kherson**.

Gold, platinum, and copper are worked chiefly in the **Urals**; also in the **Caucasus** and in **Siberia**.

Mercury in **S. Russia**. **Salt** in the neighbourhood of the **Caspian Sea**. **Petroleum** is obtained from wells in the **Caucasus** in great quantities.

Kuisk, Southern Russia. Large bed of iron ore discovered at depth of 500 ft. below surface. The ore bed is estimated to be 374 ft. thick. Believed to be richest deposit in the world.

MANUFACTURES.—Russian manufacturing industries have developed in a remarkable degree during recent years. The chief in order of importance are cotton, woollen, iron in all its branches, linen, and silk.

Others are spirits, beer, sugar, tobacco, copper-ware, bells, jewellery, leather, glass, flour and other corn products.

FIG. 163.—RUSSIA AND POLAND: PRODUCTS, MANUFACTURES, ETC.



Cotton is manufactured at Narva, near Petrograd, where water-power is available.

Woollen goods at Petrograd and Moscow.

Iron goods at **Krivoi Rog**, **Briensk** near **Orel**, at **Tula**, and in **South-west Poland**.

Ekaterinoslaf, on the **Dnieper**, produces a great quantity of pig-iron and steel.

Silk is produced in many small factories in the **Caucasus**.

TRADE.—Russia has an extensive internal trade, which is facilitated by the navigable character of the rivers. A study of the statistics bearing upon Russian commerce shows some important changes that were in progress in the character and amounts of the exports and imports. During the last few years before the Great War, there was a great increase in the imports, while the exports remained nearly stationary. Of the exports, the chief place was taken by grain and other articles of food, and the second place by raw materials and partly-manufactured goods; but while the exports remained almost stationary, the imports increased, due to the increase in Russian manufactures, and the need for raw material, such as cotton, wool, &c. The foreign trade was carried on almost entirely by foreign vessels, but Russia has a great number of vessels engaged in traffic upon the rivers, lakes, and canals.

MEANS OF INTERNAL COMMUNICATION.—By river the communication is good while free from ice; but this is a serious drawback. Russia has 33,463 English miles of navigable rivers and 453 miles of canals, the chief being between the **Neva** and **Volga**. The railway system is not extensive for the size of the country, but is increasing. The total length of railway lines is now (1913) over 35,897 miles in Europe and 10,586 miles in Asia, partly State and partly privately owned. Roads are very bad from lack of stone for construction, and sledges are still largely used in winter.

The chief centres of internal trade are **Moscow**, **Nijni Novgorod**, **Orenburg**, **Samara**, **Ribinsk**, **Tsaritsin**, **Perm**, and **Kazan**.

Nijni Novgorod has the great annual fair, when vast quantities of goods change hands. **Samara**, **Perm**, and **Kazan** are on the great trade routes to Asia. **Moscow** is a great trade centre. **Ribinsk** is sometimes called the 'Russian Chicago,' being the centre for collection and dispersion of food stuffs. **Tsaritsin** is the point on the **Volga** where goods for the **Don** navigation are transhipped.

The **IMPORTS** consist of articles of food such as tea, coffee, fish, fruits; animal products such as leather, hides and skins; coal and coke, machinery and metal goods; raw materials for manufacture such as raw cotton, silk, and wool; cotton manufactures.

The **EXPORTS** consist of wheat, flour, &c.; timber and wooden goods; flax; dairy produce; sugar; petroleum; oil cakes; furs and leather.

Note.—The paragraphs relating to Imports and Exports refer to pre-war conditions.

Russia imports machinery and woollen goods from Germany; machinery, coal, lead, woollens, and new ships from the United Kingdom; raw cotton from the United States and Egypt.

Russia sends cereals, eggs, timber, flax to Germany; cereals, timber, eggs, flax, petroleum to the United Kingdom.

SEAPORTS.—The chief ports are necessarily on the Baltic and Black Seas, not one-thirtieth of the whole traffic passing through the White Sea.

Baltic Ports.—Petrograd (1,750), Riga (185), Reval (123), Cronstadt (68), and Libau.

Minor ports are Pernau and Windau.

Black Sea Ports.—Odessa (620), Nicolaieff (103), Kherson (92), Taganrog on S. of Azof, Batoum.

Minor ports are Akerman, Kaffa, and Kertch.

White Sea Port.—Archangel.

Caspian Ports.—Baku (206), Astrakhan (150).

Petrograd (1,750) was made accessible to large vessels in 1885 by the construction of a canal through the narrow end of the Gulf of Finland, which is very shallow. It is now the second port of Russia. Since then the trade of Cronstadt has much diminished.

Reval, near the entrance of the Gulf of Finland, directly imports cotton from the United States, and is the fourth port, being nearly equal with Riga.

Riga (370), the third port of Russia, suffers from the shallowness of the Western Dwina, or Diina, and large vessels stop at Dunamunde. Here, as at several of the Black Sea ports, *e.g.*, Odessa, Kherson, and Nicolaieff, deepening of the river is being carried out.

Odessa (620) has the largest volume of trade of all Russian ports. The trade is largely in the hands of Italians, who are numerous at Odessa, and the language of commerce is chiefly Italian.

Batoum, on the eastern end of the Black Sea, has a great export of petroleum, and is the headquarters of that trade.

Libau, between the river Niemen and the Gulf of Riga, is the fifth port of Russia, and has trade similar to that of Danzig and Riga.

TOWNS.—The occupation of the Russian people is chiefly agricultural, and hence the great majority of the inhabitants live in villages.

Petrograd, with its suburbs, has a population of 1,750. It is the largest city in Russia, but is quite modern, having been founded in 1703 by Peter the Great, who extended Russian territory to the Baltic. This city is very massively and splendidly built upon a foundation of piles, the site having been a marsh when chosen by Peter as the spot for the construction of his capital. It is the centre of foreign and home trade, having connection by river, canal, and rail with all parts of Russia. It is also an important manufacturing city. The powerful fortress of Cronstadt guards Petrograd from attack by sea.

Moscow (1,050) is the capital, and differs from Petrograd in having an Eastern appearance. The most striking object is the Kremlin, a

walled enclosure with churches and palaces. The city has great manufactures and trades, and is the seat of the largest Russian University. Moscow is memorable in history for its burning by the Russians in 1812 to prevent Napoleon Buonaparte from retaining possession of it.

Odessa (620) is the chief port on the Black Sea, and is the first port of Russia in the value of its imports and exports.

Riga (185) has great trade in timber and its products, and in flax. This town is of Teutonic origin, and was an important member of the Hanse League. Other Teutonic towns in Russia are **Dorpat**, **Reval**, and **Mittau**.

Other towns with over 100,000 inhabitants are **Kharkof** (260), a great trading place on the Donetz. **Kief** (Kiev) (600), an ancient city with sugar and leather manufactures. **Kazan** (188) and **Saratof** (217), trading and manufacturing towns, the former on the Oka, and the latter on the Volga (for previous mention *see* the Volga). **Kishinef** (125) is the capital of Bessarabia. **Vilna** (192) is the chief town in Western Russia, and has much trade in grain and timber.

Other interesting places not already described are **Orenburg**, in the southern part of the Urals, the starting-point for caravans to the East; **Sebastopol**, in the Crimea, famous for its siege in 1854-55 by the allied forces of England, France, and Turkey.

In **Caucasia** the largest town is **Tiflis** (356), on the great road which goes by the Pass of Dariel through the Caucasus Mountains from south to north. Other places of interest are **Baku**, a port on the Caspian, and **Batoum**, on the Black Sea.

RAILWAYS.—**Moscow** is the centre of the railway system, lines running to the Black Sea ports; to various points in the west, where connection is made with the central European systems; eastwards to **Perm** and across the Urals to **Tyumen**; south-eastwards to **Vladikavkaz** in Cis-Caucasia, where is the northern end of the Dariel Road; eastwards to **Orenburg**; and northwards through Finland to **Uleaborg**. The European system is connected with the **Siberian** railway that crosses Northern Asia.

POPULATION.—The population of European Russia, that is of the Soviet Union, is about 131 millions. The population of Siberia is about 11 millions.

THE PEOPLE.—Slavs form the majority of the people, all true Russians being of that race.

Swedes, **Finns**, **Lithuanians**, **Letts**, and **Germans** are the chief inhabitants of the Baltic Provinces. **Mongol Tribes**—viz. **Tartars** and **Kalmucks**—together with various Asiatics of **Caucasian** family, inhabit the south-east. **Jews** to the number of 5 millions inhabit, chiefly, the western and south-western provinces.

FINLAND

Finland is a land of lakes and rivers lying between Scandinavia and Russia, and forming a part of what is called Fennoscandia. It is bounded on the south and west by arms of the Baltic Sea, on the north-west and north by Sweden, Norway, and a small strip of coast on the Arctic Ocean, on the east by Russia.

The area, since the acquisition of Petsamo, is almost 150,000 sq. miles.

POPULATION.— $3\frac{1}{2}$ millions.

CLIMATE.—Very cold winters and warm summers.

PRODUCTS.—Mainly agricultural, but most of the country lies outside the northern range of wheat: the chief crops are oats, potatoes, rye, and barley.

INDUSTRIES.—The forests form the chief source of wealth, and the chief industry is lumbering; iron is produced and there are textile and other factories. Butter is produced largely and exported.

Exports.—Paper, pulp, timber, butter, &c.

Imports.—Grain, coffee, sugar, iron and hardware goods, cotton, tobacco, &c.

TOWNS.—**Helsingfors**, population 201,000. Now estimated at 220,000.

Abo, population 59,000. An important shipping centre. Has two modern Universities, one Swedish-speaking, founded in 1919, and one Finnish-speaking, founded in 1922.

Tammerfors, population 49,000, is an important manufacturing town.

LATVIA

Republic of Latvia comprises the old provinces of Courland, Livonia, and others. Its total area is about 25,000 sq. miles, with a population of about $1\frac{1}{2}$ million.

The chief towns are Riga (185), Libau, and Mitau.

The chief crops are rye, barley, and oats, and flax and timber are exported.

ESTONIA

Republic of Estonia comprises the old province of Estland and parts of other provinces. The total area is about 17,000 sq. miles, with a population over a million.

The capital is Tallinn (Reval) (123).

The chief crops are potatoes, rye, and barley.

Exports.—Timber, potatoes, paper, flax, and cement.

Imports.—Salt, coal, sugar, and fertilisers.

EXAMINATION PAPERS.

- A. 1. Describe the relief of the surface of Russia, and compare it with that of Germany and Austria-Hungary.
2. Give a general account of the climate of Russia, and state the local causes affecting it.
3. State the advantages and disadvantages of Russian rivers for commercial purposes.
4. If we study the map on p. 289, what seaports should we expect to find exporting wheat and forest products?
- B. 1. Draw a sketch-map of the rivers flowing into the Black and Caspian Seas, marking their names and the towns upon the Volga.
2. Define the zones of production, giving some facts concerning the position and peculiarities of each.
3. Name the chief Russian manufactures, with the districts and towns engaged.
- C. 1. What and where are Kasbeck, Chatyr, Dag, Tollpos-Iz, Vaigach, Dago, Terek, Oka, Saratof, Tver, and Peipus?
2. In what ways do the rainfall and winter temperature affect agricultural products in Russia?
3. What industries are connected with Kaluga, Krivoi Rog, Narva, Tula, Perm, Orenberg, Nijni Novgorod, Ribinsk, Libau, and Reval?

RUMANIA

GENERAL DESCRIPTION.—Rumania is a fertile, well-watered country about as large as the British Isles, lying between the lower course of the Danube and the new eastern boundary of Hungary. It now includes **Transylvania** and the south-eastern ranges of the Carpathians. The fertile land in the delta of the Danube forms the **Dobruja**, part of Rumania.

Boundaries.—**North and East**, Russia and the Black Sea. **South**, Bulgaria. **West**, Hungary.

Area.—About 122,000 sq. m. **Population**, about 17 millions.

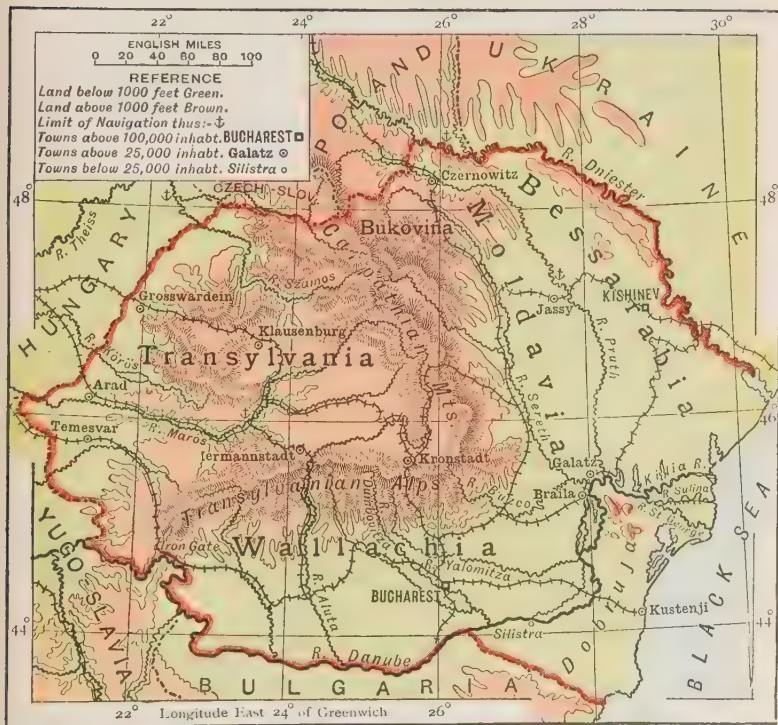
Relief.—**Carpathian Mts.** lie in the north-eastern part of the country, and the **Transylvanian Alps** form a high bridge across nearly the centre. The valleys of the **Danube**, **Sereth**, and **Pruth** are an alluvial plain. The **Dobruja** is low and swampy.

Climate.—Great extremes of winter cold and summer heat (see maps on pp. 94 and 95); the rainfall is sufficient for the growth of wheat and many other crops.

Rivers.—The **Danube** and the numerous streams that flow into it from the Carpathians. The numerous mouths and the

frequency of shoals cause the navigation to be difficult, much dredging being necessary. The chief mouth is the **Sulina**, which by frequent dredging is kept to a depth of $15\frac{1}{2}$ ft. up to Braila. The marshy character of the banks from the Iron Gate to Braila hinders commerce, and renders the construction of towns difficult.

FIG. 164.—RUMANIA.



Longmans & Co. London & New York

Hence there are but few towns on the northern bank of the Danube.

Products.—Agricultural. Farming is the great industry, and excellent crops of maize, wheat, barley, rye, flax, hemp and tobacco are raised. There are productive forests among the hills.

Mineral.—Petroleum, iron, coal, salt, &c.

Manufactures.—These are growing, and employ about 150,000

people, but Roumania depends on outside supplies of all kinds of manufactured goods.

Ports.—**Galatz** and **Braila**. The former is the more important, but the latter is growing more quickly.

Commerce.—Trade is mainly with **Austria**, **Hungary**, the **United Kingdom**, **Germany**, and **France**.

Imports.—**Metals** and **manufactures**; **woollen**, **cotton**, and **silk goods**; **machinery**; **timber**; **hides** and **leather**.

• **Exports.**—**Maize** and **wheat**; **petroleum**; **wood** and **timber**; **animals** and **animal products**.

Towns.—**Bucharest** [345,000] is the capital. **Galatz** and **Braila** are the chief ports, from which **petroleum**, **wheat**, and other **agricultural products** are exported.

EXAMINATION PAPER

1. State the position and component parts of Rumania.
2. Describe the chief physical features of Rumania.
3. State the products, imports, and exports of Rumania.
4. Draw a sketch map showing the territory gained by Rumania as a result of the Great War.

SWEDEN AND NORWAY

POSITION AND BOUNDARIES.—Sweden and Norway together make up the great peninsula of **Scandinavia**, lying between $55^{\circ} 20'$ N. lat. and $70\frac{1}{2}^{\circ}$ N. lat. It is bounded on the **west** by the **Atlantic** and **Arctic Oceans**, **east** and **south** by the **Baltic Sea**, and **north** by the **Arctic Ocean**.

It is separated from **Russia** by an isthmus 300 miles across, the boundary extending from the mouth of the **Tornea** to the **Varanger Fjord**. The boundary for a great part of the distance follows the **Tornea** and **Tana Rivers**.

SIZE.—Area of **Sweden**, 173,000 sq. miles. Area of **Norway**, 124,964 sq. miles.

Thus **Scandinavia** is the largest peninsula in Europe, being over five times as large as **England** and **Wales**.

Greatest length, 1,150 miles from **North Cape** to the south of **Sweden**. The **breadth** varies from about 250 miles to 500 miles.

RELIEF.—**Scandinavia** is a vast **plateau** from 1,000 ft. to 3,000 ft. in height, increasing in elevation from north to south and diminishing towards the east. Hence the greater part of

the low land is in Sweden, where a large portion of the surface is under 500 ft. above the sea; while in Norway a very small proportion is low land, consisting only of a narrow strip round the southern coast.

The plateau presents a surface furrowed with deep valleys and dotted with rocky mountain masses, but there is no clearly defined mountain chain. The various names given to different portions of the plateau, proceeding from south to north, are **Lange Field**; **Hardanger Field**; **Ynes Field**, upon which the highest peak is **Galdhoppiggen**, 8,400 ft. high; **Dovre Field**, upon which is **Sneehatten**, 7,500 ft. high; **Kiolen Mountains**, much further north.

To the west of **Galdhoppiggen** is **Jostedalsbrae**, a glacier with an area of 400 sq. miles.

PLAINS.—Sweden south of 60° N. lat. is occupied by an extensive plain, which passes northwards forming the coast region of Sweden, and round the head of the Gulf of Bothnia into Finland.

COAST LINE.—The Atlantic coast forms the western edge of the plateau and is very high and steep, the cliffs frequently descending straight into the sea. Numerous inlets, called **fjords**, penetrate the land, often to long distances, and afford the ordinary means by which the people pass from place to place.

The Baltic coast is generally low and flat, and is lined by innumerable small islands, which resemble in character the adjoining coasts. The chief Baltic islands belonging to Sweden are **Gottland** and **Öland**, both of which have elevated surfaces and high coasts. The chief group in the Atlantic is that of the **Lofoten Islands**, the great resort of Norse fishermen.

Between two of the **Lofoten Islands** is the famous whirlpool, the **Maelstrom**.

CAPIES.—The **Naze**, in the south of Norway; **Nordkyn**, the most northerly point on the mainland of Europe; **North Cape**, upon **Mageroe Island**.

OPENINGS.—**Varanger Fjord**, **Trondhjem Fjord**, **Sogne Fjord**, **Hardanger Fjord**, and **Christiania Fjord**, in Norway. In Sweden, the openings are very numerous but unimportant.

CLIMATE AND RAINFALL.—The winter of Scandinavia, because of its high latitude and the elevation of its surface, is necessarily long and cold, lasting seven months; while the summers are hot, especially on the Norwegian coast. The influence of warm winds from the Atlantic is shown in a remarkable manner by the fact that the openings in Norway, even as far north as **Hammerfest**, are free from ice during the winter, while the Baltic coast is ice-bound. Norway has a more abundant rainfall than Sweden. The climate is generally of a bracing and healthy character.

Local causes which modify the climate of Scandinavia are :

1. The prevailing south-west winds from the Atlantic moderate the temperature of the Atlantic seaboard. A reference to the maps of Europe on p. 94 and 95 shows that in summer the extreme north of Scandinavia is as warm as Scotland, and the central and southern parts of the peninsula have a temperature similar to that of England. The influence of the south-westerly winds is clearly shown by the bold sweep which the isotherms of 32° in the winter and of 60° in the summer make to the north.
2. The elevation of the plateau causes it to be bleak and cold.
3. The lowness of the eastern portion causes its climate to resemble that of the Great Russian Plain.
4. The snow-line is lower on the west, because of the greater quantity which falls there.

RIVERS.—The rivers are very numerous, but are generally too rapid for navigation, though they are useful for floating timber down to the ports. Nearly all the rivers expand into lakes in the long valleys that stretch to the east and south-east. In Norway, the rivers with one exception (the **Glommen**) are very short, and are mere mountain torrents.

The **Glommen** (400 miles) is the only long river in Norway. It flows from the Dovre Field in a southerly direction, receives the drainage of **Lake Mjøsen**, and enters the sea a little to the east of Christiania Fjord.

In Sweden the most important stream is the **Gota**, which receives the drainage of Lakes **Wener** and **Wetter**, and flows into the **Kattegat** after forming the **Trollhätta Falls**.

Flowing into the Baltic Sea are the **Dal**, **Angerman**, **Pitea**, **Lulea**, and **Tornea**, all of considerable length. Flowing into the Arctic Ocean is the **Tana**.

LAKES.—In Sweden are very many lakes, which cover an area of over 3,500 sq. miles. Of these, **Wener** is the largest and **Wetter** the next in size.

FERTILITY OF SOIL.—The plateau is too bleak for cultivation except where it slopes down into Sweden. Only $3\frac{1}{2}$ per cent. of the surface of **Norway** is cultivated, and 22 per cent. is forest, the remainder being unproductive. In **Sweden**, 12 per cent. is under cultivation or meadow land, and 59 per cent. is forest. The warmth of the summers causes the crops to be of similar character to those of the British Isles, and to ripen well and rapidly. In Norway, cattle and sheep rearing is of more importance than agriculture.

PRODUCTS.—1. **Agricultural.**—**SWEDEN:** Hay, roots, potatoes, oats, rye, &c.

A considerable quantity of oats is exported.

NORWAY: Potatoes, hay, oats, barley, and rye.

The quantity of grain grown is quite insufficient for the needs of the people.

FIG. 165.—SWEDEN AND NORWAY.



Walker & Boutall sc

Longmans & Co, London & New York.

2. **Animal.**—**SWEDEN** has a considerable number of the ordinary domestic animals, and exports sheep and cattle. **NORWAY** has to import living animals.

3. **Forest Products.**—**Timber**, rough and sawn; **tar** and **pitch**, **resin** and **turpentine**.

The forest products are very valuable and important. The chief trees are the fir and pine, but many others of the temperate regions abound, as beech, birch, oak, &c.

4. **Fisheries.**—The fisheries in the North Sea are very productive, the most important being the **cod**, **herring**, and **whale**. The chief commercial products of the fisheries are dried and salted fish, cod-liver oil, and train oil.

Cod are caught near and dried upon the **Lofoten Islands** in the spring. **Bergen** is the centre of the herring fishery.

5. **Mineral.**—Mining is an important industry in **SWEDEN**, but only trifling in **NORWAY**.

SWEDEN.—The chief mineral is **iron**. Others are zinc, copper, silver, lead, and some coal.

Iron is worked in two districts:—

1. The **Dannemora** district, between Stockholm and the mouth of the **Dal**.
2. The **Gellivara** Mountain, in the extreme north-east, is composed of a particularly valuable kind of iron ore.

NORWAY.—In Norway about 4,400 persons are occupied in mining and working **silver**, **copper**, **nickel**, and **iron**.

MANUFACTURES.—Textile manufactures are wanting.

SWEDEN has iron and steel, matches, paper, leather, wood-pulp, and butter manufactures.

NORWAY has only small manufactures.

TRADE.—Norway possesses a large merchant navy and a very extensive carrying trade. Nearly 5 per cent. of the world's tonnage is Norwegian, while Sweden has over 2 per cent. Their united tonnage places Scandinavia fourth to the British Empire.

MEANS OF INTERNAL COMMUNICATION.—In Sweden, by river, lake, and canal, communication is extensive, and over 9,400 miles of railway are open.

The chief canal is the **Gota Canal**, which connects the **River Gota** with **Lake Wener**, this lake with **Lake Wetter**, and the latter with the **Baltic Sea**.

Sweden possesses the most northerly railway in the world—viz. from **Lulea** to **Ofoten Fjord**, constructed to carry the iron ores of **Gellivara** to **Lulea** on the **Baltic**, or to the western coast.

In **Norway** all internal communication is difficult. Rather over 1,800 miles of railway are open. There are no canals or navigable rivers, but the fjords stretch far into the country and are the chief highways. The longest railway is from **Trondhjem** to **Christiania**, by way of the **Glommen Valley**.

IMPORTS.—SWEDEN.—Coal, metal goods, and machinery; corn and flour; cotton, woollen, and silk manufactures.

NORWAY.—Breadstuffs, such as rye, wheat, &c.; cotton, woollen, and silk goods; groceries; skins; live animals.

EXPORTS.—SWEDEN.—Timber and wooden goods; iron and iron ore; live animals and animal produce; wood-pulp, paper and paper manufactures; metal goods and machinery.

NORWAY.—Timber and wooden goods; paper and paper manufactures; animal produce, hair, skins, tallow, oil, tar, fish.

Each of the two countries maintains large commerce with the other and with the **United Kingdom, Germany, and Denmark.**

SEAPORTS.—SWEDEN.—Gothenburg (Göteborg), Stockholm, Malmo are the most important. Others are Gefle and Norrköping.

NORWAY.—Nearly all the Norwegian towns are seaports. The chief are **Christiania** and **Bergen**. Drammen, Tonsberg, Christiansand, Stavanger, and Hammerfest are all coast towns with shipping and commerce.

Gothenburg (227) has the best position and carries on the bulk of Swedish commerce.

Stockholm (422) is an emporium for goods from and to the other Baltic countries.

Christiania (258) exports timber and its products, and iron.

Bergen (91) is the great centre of the fishing industry, and has a large export of dried fish and fish products.

DISTRICTS AND TOWNS.—1. **SWEDEN** is divided into Gothland, Svealand (two ancient kingdoms and the chief inhabited portion of the country), and Nordland.

Stockholm (422), the largest city in Sweden, is situated on islands at the entrance to Lake Malar, the islands being connected by numerous bridges. The city has some fine buildings, with much commerce and important manufactures of iron, leather and textiles. Stockholm is the capital and meeting-place of the **Diet** (or Parliament).

Gothenburg (Göteborg) (227) is excellently situated for commerce, and is the chief seaport of Sweden. It has also considerable manufacturing industries.

Malmo (113), on The Sound, almost opposite to Copenhagen, has important traffic with Denmark and Germany.

Norrköping (58) has manufactures of wool and cotton.

Upsala (29), north of Stockholm, has a famous University, of which Linnæus was a professor.

Wisby, on Gottland, is a decayed town which was of great importance in the days of the Hanse League.

2. **NORWAY** is divided into Sondenfields, Nordenfields, and Nordlandens.

Christiania (258), at the head of Christiania Fjord, is the capital of Norway, and much the most important town. It is a well-built city with the royal palace, the Storting or Parliament House, a cathedral, and very interesting museum. There is some manufacture of iron and glass.

Bergen (91), on the western coast, sheltered by a fringe of islands, is the most important fishing centre.

Tromsø (55) is an ancient capital of Norway, with important fisheries and foreign trade.

Stavanger (43) has a very ancient cathedral, dating from the eleventh century.

Hammerfest is a small town within the Arctic Circle, and is visited in summer by tourists desirous of seeing the midnight sun.

Tromsø is a town of over 5,000 inhabitants within the Arctic Circle. The people are much occupied with the collection of eider down.

POPULATION.—Sweden, 5,900,000, or 34 to a sq. mile. Norway, 2,890,000, or 21 to a sq. mile.

This gives an average of 24 to a sq. mile throughout Scandinavia. The great bulk of the population live south of lat. 62° N., especially in the plain of Svealand and Gottland.

THE PEOPLE.—With the exception of about 34,000 Finns and 14,000 Lapps, the population of Scandinavia is of pure Teutonic extraction, being the Scandinavian branch of the Aryan family.

GOVERNMENT.—The Government of both Norway and Sweden is a **Limited Monarchy**, and each country has its own king. The Parliament or Diet of Sweden consists of two Chambers, both elected by the people. Norway elected its own king in November, 1905. The Parliament or Storting, when assembled, divides itself into two houses. Members of both houses are elected by the people. The principle of self-government by elected representatives prevails in all local affairs.

ARMY.—The troops are raised partly by enlistment and partly by conscription. The nominal army of Sweden consists of 60,000 men, but less than half of these are kept under arms.

NORWAY has a similar army.

SWEDEN maintains a small but efficient navy.

NORWAY has only a small navy.

EXAMINATION PAPERS

- A. 1. Give a full description of the surface of Scandinavia, stating names and positions of plateaux, mountain regions, and plains.
2. Give an account of the climate of Scandinavia, comparing the climate of Norway with that of Sweden, and stating any causes affecting it.
3. Compare the fertility of the soil in various parts of Scandinavia, and state the vegetable products.
4. Name five seaports of Scandinavia, indicate their exact position, and give any facts respecting the commerce carried on at them.
- B. 1. State the minerals worked in Sweden and Norway, showing their relative importance, and stating districts where the chief minerals are worked.
2. State the imports and exports of Sweden and Norway, and distinguish between the relative natural resources of the two countries.

3. Where and what are Gothenburg, Lulea, Gellivara, Jostedalstraë, Nörrköping, Trondhjem, Wisby, and Dannemora?
 4. Show the means of communication in Scandinavia, comparing the advantages of the two countries.
- C.**
1. Describe the coast-line of Scandinavia, naming the islands and chief openings.
 2. Give an account of the river system of Scandinavia, indicating the position of the watershed, stating the uses of the rivers, and describe one river in each country.
 3. State the manufactures of Norway and Sweden, and where carried on.
 4. Explain how the employments of the people in Norway and Sweden are affected by relief of the land, rainfall, and summer climate.

DENMARK

POSITION AND BOUNDARIES.—Denmark consists of the peninsula of Jutland, lying between the North Sea, Skager Rack, and Kattegat; a number of islands between Jutland and Sweden—viz., Seeland, Fyen (Funen), Laaland, Falster, and some smaller ones; and the island of Bornholm, in the Baltic Sea. N. Schleswig restored by Germany, 1919.

The Faroe Islands, between the Shetlands and Iceland, are also Danish territory and send representatives to the Danish Parliament.

AREA.—17,144 sq. miles, including the Faroe Islands, which are 514 sq. miles in extent.

Of the total area Jutland is about two-thirds.

RELIEF.—Jutland, with the adjoining islands, is part of the Great European Plain and has a flat or slightly undulating surface, with no elevation so great as 600 ft. Jutland, in the west, is sandy and barren, with a long string of sand-dunes lining the coast. In the east it is fertile and productive.

COAST-LINE.—The openings on the west are long, narrow, and shallow, and of little use in commerce; but those on the east are deeper and afford good harbours. The chief opening is Liim Fjord, which in 1825 became a passage from east to west, cutting off the northern part of Jutland.

The chief channels are The Sound, between Seeland and Sweden; Great Belt, between Seeland and Fyen; and Little Belt, between Fyen and the mainland.

CAPES.—The chief cape is The Skaw, forming the northern point of Jutland.

CLIMATE AND RAINFALL.—The winters are long and severe, with a tendency to fogs, but the summers have sufficient heat to ripen wheat and other cereals. The rainfall is sufficient, and there are numerous small rivers.

FERTILITY OF THE SOIL.—The islands and the greater part of Jutland have fertile soil, about 80 per cent. of the surface being productive.

PRODUCTS.—1. **Agricultural.**—The chief crops are beetroot, oats, potatoes, barley, rye, and wheat. One of the chief crops is beetroot, which provides winter food for the cattle.

Large quantities of butter are made in factories and exported, and the making of butter has been developed enormously in recent years.

2. The minerals of Denmark are insignificant.

3. **Animals** are numerous and valuable. Cattle, horses, sheep, and pigs are reared and exported in large numbers.

MANUFACTURES.—The peasants pursue several industries in their homes, and there are considerable quantities of textile fabrics manufactured at **Copenhagen**, but large quantities are imported. The chief manufactured products are butter, brandy, sugar, gloves, and pottery.

TRADE.—Denmark chiefly trades with Germany, the United Kingdom, and Sweden, receiving as imports manufactured goods, as woollens, cottons, &c., iron and steel wares, sugar, timber, coal, and coffee. Exports: Butter, eggs, bacon, cattle, barley, wheat, and horses.

PORTS.—**Copenhagen**, on Seeland, is the chief. Others are **Esbjerg**, on the North Sea, **Aalborg**, **Elsinore**, and **Aarhuus**.

TOWNS GENERALLY.—**Copenhagen** (561, or, with suburbs, 666), partly on Seeland and partly on the small island of **Amager**, possesses many large buildings, including the Royal Palace, the Museum of Antiquities, the Thorwaldsen Museum, Arsenal, &c. **Copenhagen** is also the chief port and eleven times as large as the next largest town.

Aarhuus (74), on the east of Jutland, is the second largest town, and the centre of trade in Jutland.

Odense (49) is the chief town upon Fyen.

Aalborg (71) is an important town upon Liim Fjord.

Elsinore (Helsingör) was formerly important as the point where the Baltic tolls were collected.

Fredericia, in Jutland, commands the entrance of the Little Belt.

Frederiksborg, near **Copenhagen**, is the summer residence of the King of Denmark.

POPULATION.—3,289,000, or 192 to a sq. mile (including the Faroe Islands).

As in Scandinavia, the people are almost exclusively Teutonic.

GOVERNMENT.—A Limited Monarchy, with two Houses of Parliament, called the **Rigsdag**, almost all elected by the people, a few of the Upper House being nominated by the King.

FAROE ISLANDS, in lat. 62° N., a group of rocky islands with an area of 540 sq. miles, inhabited by about 21,000 people, who are occupied with fishing, fowling, and sheep-rearing.

FIG. 166.—DENMARK.



Walker & Bondall & Co.

Longmans & Co. London & New York.

ICELAND (nearly 40,000 sq. miles in extent) is a rocky and mountainous island just south of the Arctic Circle. It has been peopled by Norse for a thousand years, and is still attached to the Danish Crown. The island is very volcanic, with a great volcano, Mount **Hekla** (5,100 ft.), from which flow great quantities of lava. Great **Geysers** are also numerous, spouting out hot water. In the south-east are vast glaciers called **Jökulls**. The people are occupied with fishing, fowling, sheep-rearing, and some little agriculture; but the soil is generally very barren and the summer too short for the perfect ripening of corn. Population about 94,000. The capital is **Reikjavik**.

GREENLAND.—Denmark exercises sovereignty over a large tract of land in Greenland, almost 50,000 sq. miles in area, inhabited by about 14,000 people, who live mostly on the west coast.

EXAMINATION PAPER

1. Give an account of the physical geography of Denmark—its relief, coasts, islands, and climate.
 2. Name the various products of Denmark, together with imports and exports.
 3. Denmark exports a large quantity of agricultural products. What physical conditions have led to this?
 4. Describe Iceland, and name the positions of Faroe Islands and other islands belonging to Denmark, with their productions.
 5. What do you know of Copenhagen, Aarhus, Aalborg, Elsinore, and Fredericia?
-

THE IBERIAN PENINSULA

POSITION AND BOUNDARIES.—Spain and Portugal make up the great Iberian Peninsula, which forms the south-western portion of the continent of Europe. It is bounded on the west and south-west by the Atlantic Ocean, north by the Bay of Biscay and the Pyrenees Mountains, east and south-east by the Mediterranean Sea, and is separated from Africa by the Strait of Gibraltar.

SIZE.—Area.—Spain (islands included) 194,783 sq. miles; Portugal, 35,490; total, 230,273 sq. miles.

This is nearly twice the extent of the British Isles.

Greatest Length.—East to west, 670 miles.

Greatest Breadth.—North to south, 540 miles.

RELIEF.—Almost the whole surface of the Iberian Peninsula is a high plateau, which approaches the sea in the north and east, is separated from the Pyrenean highlands by the valley of the Ebro in the north-east, and is bordered by wide river valleys and coast plains in the west and south. The plateau is crossed by many mountain ranges called **Sierras**, and the average height of the land surface is very considerable, being between 2,000 and 3,000 ft. The mountain chains extend in almost parallel lines from east to west, gradually diminishing in height towards the west; and the great river basins occupy the intervening spaces.

MOUNTAINS AND HEIGHTS.—1. The **Pyrenees**, continued westward into the **Cantabrian** and **Asturians** Ranges. The Pyrenees form a magnificent mountain chain with many lofty peaks, little inferior to the Alps in grandeur. The highest peak is **Nethou**, nearly 11,200 ft., in the group **Maladetta**. Mount **Perdu**, further west, is 11,000 ft.

The passes are very high and much less numerous than those of the Alps, and the only railways from France into Spain pass round the east and west extremities of the range.

In the higher regions of the Pyrenees are vast depressions, almost circular in shape, called **Cirques**, surrounded by great precipices and opening at one side into a river valley.

2. **Mountains of Castile**, the great central ranges of the peninsula, comprising **Sierre de Guadarrama**, **Sierra de Gredos**, and **Sierra de Gata**; and in Portugal **Sierra da Estrelha**. The average height of this system is over 8,000 ft.

3. **Sierra Morena**, forming the southern edge of the plateau and overlooking the wide valley of the Guadalquivir to the south. **Sierra Monchique**, in the south-west of Portugal, is a continuation of the range.

4. **Sierra de Toledo** and **Sierra de Guadalupe**, between the mountains of Castile and the Sierra Morena, divide the plateau of New Castile and Estremadura into two portions and separate the basins of the Tagus and the Guadiana.

5. **Sierra Nevada** (Snowy Range), in the extreme south, is higher even than the Pyrenees, the highest peak, **Mulahacen**, being 11,500 ft.

This range lies near the southern coast, and many short ranges stretch from it towards the Guadalquivir.

PLAINS.—The only plains are the low lands in the lower courses of the Tagus, Guadiana, and Guadalquivir, and the middle course of the Ebro.

COAST-LINE.—In the north the coast-line is very rugged, and in the north-west are many deep openings, like fjords, called **Rias**. The remaining coasts consist of stretches of low land lying between lofty headlands. The tides on the Atlantic seaboard are very high, but are scarcely perceptible in the Mediterranean.

CAPES.—**Ortegal**, **Finisterre** (Land's End); **Roca**, the most westerly point; **St. Vincent**, **Trafalgar**, off which the famous battle was fought in 1805; **Tarifa**, **Europa**, on Gibraltar Promontory, which has belonged to Britain since 1704; **Palos**, **St. Martin**, and **Creux**.

OPENINGS, &c.—**Bay of Biscay**, **Ferrol Harbour**, **Vigo Bay**, **Estuary of the Tagus**, **Trafalgar Bay**, **Valencia Bay**, **Strait of Gibraltar**.

ISLANDS.—**Balearic Islands**, in the Mediterranean Sea, consisting of **Majorca**, **Minorca**, **Iviza**, the three chief, together with **Formentera** and **Cabrera**.

Many small islands border the north-west coast.

CLIMATE AND RAINFALL.—The climate varies much in different parts, but is on the whole the driest of any country in Europe. The rain-clouds are condensed on the mountains forming the edges of the great **plateau**, and hence the plateau itself receives very little rain and is an arid expanse, with extreme cold in winter and great heat in summer. In the north and west the rainfall is abundant and the climate pleasant, with products similar to those of Southern France. In the Guadalquivir Valley great heat prevails in summer, but there is a good system of irrigation and the soil is very productive. On all the lowlands and terraced uplands bordering the plateau irrigation produces fertility. In the extreme south and east the climate is very hot, and tropical plants grow freely. Low regions, subject to **malaria**, lie between the Gadiana and Guadalquivir, also in the south of Valencia and at the mouth of the Ebro.

Local causes which modify the climate of Spain and Portugal:—

1. The great elevation of the surface causes the winter temperature to be low. A reference to the maps of Europe on pp. 94 and 95 will show that the winter climate of the greater part of Spain is similar to that of Ireland and the west of England, whereas over a large part of the country in the summer the temperature reaches over 80°.
2. The nearness of Africa, from which hot winds blow in summer.
3. The bordering highlands, which receive the rainfall and so deprive the interior of moisture.

RIVERS.—The watershed on the plateau is generally nearer to the east than to the west coast, and, therefore, the long rivers, with one exception, flow to the west into the Atlantic Ocean. The insufficient rainfall causes the volume to be generally small in proportion to the length; while in the passage to the lowlands the many rapids cause the rivers to be of little use for navigation. The chief rivers are the **Minho**, **Douro**, **Tagus**, **Gadiana**, and **Guadalquivir**, flowing into the Atlantic Ocean; the **Ebro**, into the Mediterranean Sea. Rivers of less importance are the **Segura**, **Jucar**, and **Guadalaviar**, flowing into the Mediterranean; the **Bidassoa**, forming the boundary between France and Spain in the north-west.

The **Minho** (200 m.) is a swift mountain stream draining the north-western provinces.

The **Douro** (460 m.) drains the largest basin of all the Iberian rivers. It receives many mountain torrents, and even near its mouth is impeded by rapids. The chief town is **Oporto**, at the mouth.

FIG. 104.—THE IBERIAN PENINSULA.



Walker & Fentall sc.

Longmans & Co. London & New York.

The **Tagus** (510 m.), the longest river in the peninsula, flows almost parallel with the Douro. This river rises in a group of highlands in the east of the plateau; and there also rise the Guadalaviar and the Jucar, flowing into the Mediterranean, and also some tributaries of the Ebro. The chief tributary of the Tagus is the **Xarama**, which receives the **Manzanares**, upon which is **Madrid**. Upon the estuary is **Lisbon**.

The **Guadiana** (450 m.) is remarkable for flowing underground for several miles in its upper course. It is navigable for a few miles near the mouth. The chief town upon the river is **Badajoz**, which was besieged and taken by the British from the French in 1812.

The **Guadalquivir** (290 m.), the most equable in volume and flow amongst the Iberian rivers, drains the southern slopes of the **Sierra Morena** and receives tributaries from the **Sierra Nevada**. It is navigable for large vessels to **Seville** and for smaller ones to **Cordova**.

The **Ebro** (420 m.) receives tributaries from the Pyrenees and from the eastern highlands of the plateau, and is navigable for a considerable distance. This river forms a **Delta**. The chief town upon the Ebro is **Saragossa**.

FERTILITY OF SOIL.—About four-fifths of the soil of Spain is classed as productive, but a large part of this is under natural grass, which often dies off in the dry season. Large districts on the plateau are used in summer for the grazing of flocks of sheep which descend to the valley in the winter. In the provinces bordering on the Mediterranean, Andalusia, Valencia, Murcia, and Catalonia, are many irrigated tracts or gardens called **Huertas**, which produce much sub-tropical produce. Some of these huertas date back to the time of the Romans and others are of Moorish origin. In Portugal, rather more than one-half of the surface is under grass, forest, or crops; the remainder is waste.

PRODUCTS.—1. **Agricultural.**—**SPAIN :**

1. The **vine** is the chief object of culture, wine being the most valuable export.

2. Wheat, rye, barley, maize, esparto, flax, hemp, and pulse are the leading field-crops.

3. Oranges, grapes and raisins, nuts and olives, are grown and exported in great quantities.

4. Cork. The bark of the cork-oak is a very valuable product.

PORTUGAL.—Vine, wheat, maize and rye, olives, tomatoes, onions, figs, oranges, potatoes, cork.

Portugal and Spain have to import wheat, and Portugal also maize.

2. **Animal.**—**SPAIN.**—Sheep of the famous merino breed, producing excellent wool; mules, asses, cattle, and horses. The silkworm is extensively reared.

PORTUGAL.—Swine are fed in large numbers in the acorn woods; cattle.

3. **Mineral.**—**SPAIN** is very rich in minerals, some of her mines having been worked since the time of the Phœnicians.

Coal-beds exist but are not extensively worked, and hence the bulk of the ores raised in the Peninsula is exported, mostly to England. The British demand for the **iron-ore** of the **Basque Provinces** has caused a great development of the mining industry. Valuable **iron-ore** is also mined near Murcia. The chief minerals worked in Spain are **iron, quicksilver, lead, and copper**, with zinc, rock salt, and coal. The quicksilver mines at **Almaden** are exceedingly valuable.

PORTUGAL suffers much from want of fuel and cheap transport, and many valuable mines remain idle. The minerals are **salt, iron, lead, copper, manganese, gypsum, lime, and marble**.

The bay salt obtained by evaporation and exported from Setubal is remarkably good.

MANUFACTURES.—The manufactures of Spain and Portugal are relatively unimportant. Manufacturing industries are carried on to a considerable extent only in the province of **Catalonia**, and in the provinces touching the Bay of Biscay—viz. Basque Provinces, Old Castile, and Asturias. In Spain the manufactures are **wine, iron, cotton, silk**, and also leather, cork, and paper.

Wine is largely produced in Andalusia and exported from **Seville** and **Jerez**. It is remarkable that large quantities are exported to France and re-exported from that country.

Iron is smelted and manufactured in increasing quantities at **Bilbao, Santander, and Oviedo**. **Toledo** has been famous for several centuries for excellent **sword-blades**, and still produces them.

Cotton goods are made at **Barcelona**, the chief manufacturing city of Spain. **Silk** at **Valencia** and **Murcia**.

Portugal manufactures **wine, corks, and salt**.

TRADE.—Internal trade is hindered by the lack of easy means of communication. The great natural resources of the Peninsula have suffered from neglect and mismanagement, but are now making steady progress. Generally speaking, the imports are manufactured textile fabrics and metal goods, with wheat and other articles of food or luxury from tropical countries. The exports are the products of mines, forests, vineyards, and fruit gardens.

Two-thirds of the Spanish trade is with the United Kingdom, France, the United States, Germany, and her Colonies. The United Kingdom has the largest share in the trade of Portugal, the United States, France, Germany, and Brazil having most of the remainder.

MEANS OF INTERNAL COMMUNICATION.—The rivers are for the most part useless for commerce. Also, from their flowing in deep beds, they do not assist in the making of canals, and, therefore, navigable canals are

very few. The only navigable canals are a short length at the mouth of the Ebro—viz. the **Amposta Canal**, and the **Imperial Canal**, along the mid-course of that river, one of the oldest in Europe, having been ordered by Charles V., and partially constructed in the sixteenth century. The steep ascents from the plains to the plateau also render the construction of railways difficult, and the mileage is small in proportion to the area. Railway communication with France is effected only at the eastern and western ends of the Pyrenees, and there the gauges are different, so that all goods have to be transhipped from train to train. At the end of 1912 there were 9,000 miles of railway open. As a rule, the roads in the Peninsula are bad. The chief inland trading centre of Northern Spain is **Valladolid**. **Madrid** is the chief railway centre. **Toledo** is a busy manufacturing and trading town.

FOREIGN TRADE.—SPAIN.—Imports.—The most important in 1921 were **raw cotton** and **manufactured cotton goods**; grain, wine, sugar, &c.; machinery and metal goods; chemical products; timber and its manufactures; coal. Others were spirits, hemp, linen and jute (raw and manufactured), hides, oils, coffee, and silk goods.

Exports.—Wine, in value more than one-third of the total export; minerals and metals—viz. iron, copper, lead and zinc, quicksilver, &c.; fruits, cork, flour, and **esparto**. Others are wool, cattle, olive oil, cotton goods, table vegetables, and paper.

The imports are mainly from the United Kingdom, France, the United States, Germany, and the Spanish Colonies. The exports are mainly to the United Kingdom, France, Germany, the United States, and the Colonies.

PORTUGAL.—Imports.—The following make up nearly 40 per cent. of the total:—**Wheat**, cotton goods, woollen goods, machinery, iron, and coal. Others are sugar, fish, railway material, chemicals, animals, and timber.

Exports.—Wine, cork, cottons and yarn, fruits, copper, fish, tobacco leaf, and timber.

A large proportion of Portuguese foreign trade is with the United Kingdom.

SEAPORTS.—SPANISH.—**Barcelona** (710), **Valencia** (243), **Seville** (205), **Malaga** (150), **Cartagena** (96), **Bilbao** (112), **Santander** (72), **Huelva**, **Palos**, and **Cadiz**.

Barcelona is the most important seaport and manufacturing city in Spain. **Valencia** and **Malaga** have great export of fruit. **Seville**, on the Guadalquivir, has a navigable channel kept open by constant dredging, and exports wine and oranges. **Bilbao** and **Santander**, on the Biscay coast, export great quantities of iron-ore. **Huelva** is the port for the export of copper-ores from the **Rio Tinto** mine. **Palos** is a small port, historically interesting because Christopher Columbus sailed thence on his first voyage to America. **Cadiz** is accessible only by small vessels.

PORTUGUESE.—Oporto (203), Lisbon (490), Setubal.

Oporto, or Porto, at the mouth of the Douro, which is obstructed by a bar, and a new harbour is being constructed to the north of the mouth of the river. The port has a great export of port wine.

Lisbon, on the estuary of the Tagus, has a fine natural harbour, but lacks docks and quays.

Setubal manufactures and exports salt.

SPAIN

PROVINCES AND TOWNS.—Spain is made up of a number of provinces which retain the names and boundaries of ancient kingdoms. Some of these were formed in early times, and others in the struggles between the Christians and Muhammadans. These provinces no longer have distinct governments, but the ancient names are used by the people, who show marked differences in character.

1. **Catalonia** (*i.e.* Gothalandia) is a mountainous district, with soil not naturally fertile, but is well cultivated and rendered productive by the industry of the inhabitants, the most energetic in the Peninsula. This is the chief manufacturing province.

Barcelona (710) is the chief port and manufacturing city in Spain and the second in population. It is an ancient city and well known in history. Here Columbus was received by Ferdinand and Isabella after his discovery of America. Barcelona is also famous for its siege by the Earl of Peterborough in 1705, when he took it for the Archduke Charles.

Other trading towns are **Tortosa** and **Tarragona**.

In the Pyrenees is **Andorra**, a republic of 200 sq. miles in extent, under the protection of France and Spain.

2. **Valencia** and **Murcia** are provinces on the Mediterranean coast, with rich and fertile valleys near the sea, but high and comparatively barren in the interior. In the lowlands are the famous irrigated valleys known as **Huertas**, which were made productive by the Moors and now produce abundant crops of fruits, rice, and even cotton and dates. The huerta at **Elche** is famous for its date palms.

Valencia (243) is a very ancient town, with silk industries and export of fruit.

Alicante and **Cartagena** are thriving seaports.

Murcia (141) has the chief silk manufacture in Spain.

3. **Andalusia** is named from the Vandals. It is the most fertile province, embracing the valley of the Guadalquivir, and has the finest climate in Spain. In this province the last Moorish kingdom existed, Granada being the last city held by the **Muham-**
madans.

Seville (205) is a very ancient city, having been occupied by Phœnicians, Romans, and Moors. Great trade is carried on, especially in wine and oranges, and the city has manufactures of iron and silk.

Almeria and **Malaga**, on the south coast, have important export of fruit. **Cordova**, which formerly had a great manufacture of leather, is now much decayed.

Granada is famous for the **Alhambra**, a Moorish palace, taken by the Spaniards in 1492. The city is surrounded by the **Vega**, an irrigated plain. **Cadiz** (Phœnician *Gades*) is a seaport on a small island, with a large export of sherry from **Jerez**.

4. **Galicia** is a province in the north-west filled with mountain ranges which have often afforded a place of retreat from invaders. The inhabitants, **Gallegoes**, are very industrious, cultivating their valleys with great care and also migrating to other provinces in search of work, particularly to Oporto in the wine season.

Santiago is the capital, with an ancient cathedral, to which pilgrimages were formerly common.

Corunna is a fortified seaport famous for the battle in 1809 in which Sir John Moore defeated the French but was himself slain. **Ferrol** is a naval port, with dockyard and arsenal.

5. **Asturias** is a province adjoining Galicia and similar to it in natural features. The people are a race of Gothic extraction who united in early times to fight the Saracens and formed a kingdom.

Oviedo is the capital, with a large coal-field, upon which is **Trubia**, where is the Government arsenal for the manufacture of cannon. The coal from this coal-field is shipped from **Gijon**, the chief port in the province.

6. **Biscaya**, or **Basque Provinces**, is inhabited by a remarkable race called **Basques**, who are descended from the ancient **Iberians** and speak a language different from any other in Europe. They are a very energetic people, and the province has flourishing mining and manufacturing industries.

Bilbao and **San Sebastian** are the chief towns, and are ports from which much iron-ore is exported to England.

7. **Provinces of Castile, Old and New**, with **Leon** and **Estremadura**, occupy the main portion of the tableland, and are the most thinly peopled portions of Spain, consisting largely of bleak and barren uplands, upon which many sheep feed in summer.

Madrid (751), on the **Manzanares**, in New Castile, is the most elevated capital in Europe and has an unpleasant climate, being hot and dry in summer, cold and dry in winter. It is chiefly of importance as the capital and residence of the Sovereign.

Toledo, on the **Tagus**, with many fine churches and Moorish buildings, has manufactures of sword-blades, wool, and silk.

Valladolid, in Old Castile, is an important centre of trade.

Leon and **Salamanca** are the chief towns in Leon, the latter famous for its University. Wellington defeated the French in a great battle near Salamanca in 1812.

Ciudad Rodrigo, in Leon, and **Badajoz**, in Estremadura, were besieged and taken by the English in 1812.

8. **Aragon** is an inland province stretching from the Pyrenees southward across the Ebro Valley and occupying a part of the plateau. The surface resembles that of Catalonia, but the inhabitants do not show the same energy as the Catalans in developing the natural resources, and, consequently, the province is thinly peopled and poor. The chief town is—

Saragossa (Zaragoza), a corruption of Cæsar Augusta, which name was given to it by the Romans.

BALEARIC ISLANDS consist of Majorca, Minorca, Iviza, Formentara, and Cabrera, and some small islets, and have an area of 1,860 sq. miles. These islands are naturally fertile, and produce good crops of fruit and olives. Large numbers of cattle are reared.

Palma, on Majorca, and **Mahon**, on Minorca, are the chief towns. The last named was held by the British several times in the eighteenth century.

THE CANARY ISLANDS are a group in the Atlantic not far from the West Coast of Africa, between 27° and 30° N. lat. They have an area of 2,808 sq. miles. The chief are **Teneriffe** and **Grand Canary**. The climate is delightful and the soil productive, the chief products being grapes, fruit (oranges, figs, lemons, &c.), corn, sugar, and tobacco. In recent years these islands have become a favourite health resort for English.

Santa Cruz, in Teneriffe, is the chief town. Teneriffe is famous for its volcanic peak rising abruptly from the Atlantic to a height of 12,000 ft.

PORTUGAL

PORTUGAL consists of six provinces and seventeen districts, and also the **Azores** and **Madeira** Islands are considered as integral parts of the kingdom of Portugal.

Lisbon (490), the capital, is excellently situated upon the estuary of the Tagus, but ships are inconvenienced through the want of quays and docks. The city is memorable for the terrible earthquake of 1755, when it was destroyed and about 60,000 lives were lost.

Oporto (203) is the only other large city in Portugal. (*See Seaports.*)

Setubal has a large export of the bay salt obtained by evaporation on the neighbouring coast.

Coimbra, on the right bank of the **Mondego**, is the old capital of Portugal, and has signs of its former greatness. **Braga** is a town in the interior of the country with about 22,000 inhabitants.

Cintra is a prettily situated town near Lisbon, and is much resorted to by the wealthy of that city.

The **Azores** lie far out in the Atlantic, in about the latitude of Lisbon. The chief island is **St. Michael**, which is famous for its oranges.

The **Madeira** Islands lie off the coast of Africa to the north of the Canary Islands, and are famous for wine. The chief town is **Funchal**, well known as a calling place for vessels.

POPULATION.—**SPAIN**, $21\frac{1}{4}$ millions, or 109 to a sq. mile.

PORTUGAL, nearly 6 millions with the Azores and Madeiras, or 164 to a sq. mile in Portugal.

In Spain the most densely peopled district is that of **Barcelona**, and in Portugal that of **Minho**. The coast provinces are much more thickly peopled than those of the interior.

THE PEOPLE.—The only people in Spain of unmixed blood are the Basques, who are descended from the ancient Iberians, the earliest known inhabitants of the Peninsula. The people of the other provinces are composed of **Keltic**, **Latin**, **Teutonic**, and **Moorish** elements in varying degrees, and hence the distinctive characters in the people of various districts—*e.g.* the industrious **Catalans** and **Gallegoes**, the indolent **Aragonese**, the proud **Castilians**, &c.

GOVERNMENT.—In Spain the government is a **Limited Monarchy** with two Houses, unitedly called **Cortes**, of which the Upper is partly hereditary, partly official, and partly elected. The Lower House is entirely elective. Portugal has recently (1910) become a Republic.

GIBRALTAR (BRITISH)

The Rock of **Gibraltar** is a promontory near the most southerly point of Spain. Its area is nearly two sq. miles, and it attains an elevation of over 1,400 ft.

Gibraltar is governed as a British Crown Colony. Population about 20,000, of which about 3,000 form the garrison. It has belonged to Great Britain since 1704.

The nearest point of Africa is only 13 miles distant, so that Gibraltar commands the entrance to the Mediterranean.

FOREIGN POSSESSIONS.—Spanish :

In Africa.—**Rio de Oro** and **Adrar**, **Ifni**, near **Cape Nun**, **Fernando Po**, and other places on the **Gulf of Guinea**. **Tetuan** and **Ceuta**, opposite Gibraltar.

Portuguese :

In Africa.—**Cape Verde** Island, **Guinea**, **Prince's**, and **St. Thomas' Islands**, **Portuguese West Africa**, between the rivers **Congo** and **Cunene**, and **Portuguese East Africa**, a vast province between **Zululand** and the river **Rovuma**.

These Colonies have an area of about 800,000 sq. miles, and an estimated population of over 9 millions.

In Asia.—Goa in India, Timor in the Malay Archipelago, Macao in China. Area, 8,900 sq. miles. Population, about one million.

EXAMINATION PAPERS

- A.** 1. Describe the mountain ranges of the Iberian Peninsula, showing position, direction, and heights of the various ranges.
 2. Give an account of the climate of Spain and Portugal, stating the local causes.
 3. Name the chief minerals worked in Spain and Portugal, and indicate the localities of the mines so far as possible.
 4. Where and what are Elche, the Alhambra, Andorra, Palos, the Vega, Badajoz, Ferrol, Trubia, Manzanares?
- B.** 1. Describe the river system of the Peninsula, showing the peculiarities of the rivers, with causes and results of the same, and draw a sketch-map, inserting the rivers.
 2. Give an account of the productiveness of the soil, and show how and where it is artificially improved. State chief vegetable products of Spain and Portugal.
 3. Name ten seaports; state their position, their special exports, and their relative importance.
 4. What physical causes have operated against Spain becoming a great manufacturing country?
- C.** 1. Name the provinces of Spain, and indicate any peculiarities in surface and climate.
 2. Say what you can of Valladolid, Ciudad Rodrigo, Saragossa, Gijon, Cordova, Setubal, Huelva, and Almaden.
 3. Describe the Balearic Islands.
 4. Give an account of the manufacturing industries of Spain and Portugal, stating chief manufacturing provinces and towns.

ITALY

POSITION AND BOUNDARIES.—Italy is a remarkable peninsula projecting itself into the Mediterranean Sea and having well-defined natural boundaries on all sides.

It is bounded by the Alps in the north, where it touches other countries; on the west by the parts of the Mediterranean known as the Ligurian and Tyrrhenian Seas; on the east by the Adriatic Sea.

Being thus naturally separated from neighbouring countries, it seems fitting that Italy should constitute a single State.

SIZE.—Area, 117,000 sq. miles. Greatest length, about 700 miles. Greatest breadth, 350 miles across the northern plain. The peninsula varies from 20 to 140 miles in width.

RELIEF.—The northern portion is almost entirely occupied by a plain which stretches from the southern spurs of the Alps in the north to the Apennines in the south. This plain is watered by the Po and its tributaries, with several other rivers, and the greater part of it is known as the **Plain of Lombardy**. The peninsula proper is almost filled by the **Apennine** mountain system, which approaches close to both the east and west coast, but leaves lowlands of varying extent in different parts. At many places round the coasts are low unhealthy marshes, notably the **Roman Campagna** and the **Pontine Marshes**.¹ The watershed is generally nearer to the east than to the west, and hence the longest rivers flow to the west.

The **Apennines** are a limestone range, which really form a continuous chain with the Alps, being connected with the **Maritime Alps** by the **Ligurian Alps**. Sweeping through the peninsula to the extreme south, the range passes into Sicily. The highest point of the range is found in the group called **Gran Sasso d'Italia**, in which **Monte Corno** reaches a height of nearly 10,000 ft. Other heights are **Mount Vettore**, 8,400 ft., and **Mount Cimone**, 7,100 ft. Near Naples is the famous volcano, **Mount Vesuvius**, 3,900 ft.; and on the eastern coast is **Mount Gargano**, occupying a promontory of the same name as the mountain.

In Sicily is **Mount Etna**, about 11,000 ft., also a volcano, remarkable for its regular conical shape.

PLAINS.—The **Plain of Lombardy**, including parts of **Venetia** and **Piedmont**, and nearly 18,000 sq. miles in area, forms the basin of the Po, and is one of the most fertile and productive plains in the world.

Other plains are : The **Plain of Apulia**, a comparatively dry and barren district. **Plain or Valley of Arno**, and **Campania**, near Naples. The **Campagna** and the **Pontine Marshes**, in the neighbourhood of Rome.

• **LAKES.**—There are two lake systems :

1. The **Alpine Lakes**, in the transverse valleys of the Alps opening southwards. The four chief are **Maggiore**, **Como**, **Iseo**, and **Garda**.
2. The **Apennine Lakes**—viz. **Trasimene**, **Bolsena**, and **Bracciano**.

Besides these is **Valli di Comacchio**, a salt lake in the eastern part of the great plain.

COAST-LINE.—The coast is bordered generally by a strip of lowland of varying width, except round the **Gulf of Genoa**, where the Alps descend directly into the sea, forming the famous

¹ The planting of the Australian eucalyptus tree is rendering some of these unhealthy districts more habitable.

Riviera. The west coast is more broken and has better harbours than the east coast, which is very regular in outline, and in **Venetia** and **Emilia** is advancing upon the sea at a considerable pace.

CAPES.—**Spartivento**, the most southerly point of the peninsula. **Di Leuca**, at the extremity of Apulia. The **Gargano Promontory**. These are the chief on the mainland. In south-eastern Sicily is **C. Passaro**. The southern point of Sardinia is **C. Spartivento**, and **C. Corso** is the northern point of Corsica.

SEAS.—The **Mediterranean Sea** washes all the coasts of Italy. That part of the Mediterranean which is on the east is called the **Adriatic Sea**. On the west are the **Ligurian** and **Tyrrhenian Seas**.

OPENINGS.—Gulfs of **Manfredonia**, **Taranto**, and **Squillace** on the east. Gulfs of **Eufemia** and **Policastro**, **Bay of Naples**, and Gulf of **Genoa** on the west.

STRAITS.—Strait of **Messina** separates Sicily from the mainland. Strait of **Bonifacio** is between Corsica and Sardinia. Channel of **Otranto** separates south-eastern Italy from the **Balkan Peninsula**.

ISLANDS.—**Sicily**, **Sardinia**, and **Corsica** form one group, but Corsica belongs to France. **Elba** is off the coast of Tuscany, and has deposits of very valuable iron-ore; it is famous as the residence of Napoleon Buonaparte during part of 1814 and 1815. **Ischia** and **Capri**, at opposite sides of the Bay of Naples. **Lipari Islands**, off the north of Sicily, one of which is **Stromboli**, containing a volcano remarkable for its very frequent eruptions.

Note.—Sicily and Sardinia are described among the provinces of Italy.

CLIMATE AND RAINFALL.—Generally speaking, the climate of Italy is more favourable than that of Spain. The northern plain has hot summers and rather cold winters from its nearness to the Alps. The middle section has a good rainfall and a pleasant climate. The south is dry and hot, resembling that of Spain. This portion suffers from a hot wind from Africa called the **Sirocco**. The coast of the Gulf of Genoa, called the **Riviera**, being sheltered by the Alpine ridge, has a delightful winter climate, and is the resort of invalids and pleasure-seekers from all Europe. The lake region immediately south of the **Lepontine** and **Rhætian** Alps also enjoys a milder climate than the plain further south, and many plants flourish there that cannot live near the middle of the Plain of Lombardy. Unlike Spain, the mountains in Italy generally aid the rainfall, and cause it to be widespread rather than confined to the coasts.

FIG. 168.—ITALY.



Local Causes which Influence the Climate of Italy :

1. The mountain barrier in the north protects the districts lying immediately at the foot; but a cold wind from the Alps renders the winter of Lombardy much more severe than that of Central and Southern Italy.

2. The nearness of the sea to almost every part has a moderating influence. A reference to the map of Europe of January isotherms on pp. 94 and 95 will show how the nearness to the sea affects the winter climate, not only in Italy, but along all the northern shores of the Mediterranean.

3. The nearness of Africa to the south causes the summers to suffer from a very hot and dry wind.

4. The situation and direction of the mountain chains cause the rainfall to be well distributed.

FIG. 169.—NORTHERN ITALY.



RIVERS.—The only large river in Italy is the Po (450 miles).

This river has a remarkably well-defined basin, having the Alps on the north and the Apennines on the south. Its chief sources are in the Alps from **Monte Viso** to **Mont Cenis**, and the river flows almost due east to the Adriatic, receiving many important tributaries from the Alps on the left and the Apennines on the right. The chief are the **Dora Baltea**, **Ticino**, **Adda**, and **Mincio** on the left, and the **Tanaro** on the right. A considerable delta is formed before the river joins the sea. This river is largely fed by Alpine glacier streams, and therefore has a large volume in summer. In consequence of the great quantity of solid matter brought down, the bed of the Po has been raised, and the river has to be prevented from overflowing by embankments. Also, the solid deposit at the mouth is causing the land to gain on the sea: e.g. **Ravenna**, once a port, is now four miles inland. Some of the chief towns on the Po and its tributaries are **Turin** and **Piacenza**, on the main stream; **Milan**, **Mantua**, and **Verona**, on tributaries.

Other rivers of the plain are the **Adige**, from the Tyrol, **Brenta**, and **Piave**, all entering the Gulf of Venice north of the Po.

The chief rivers of the peninsula are the **Arno**, 150 miles, and the **Tiber**, 210 miles.

Others are the **Volturmo** and the **Ofanto**. Numerous mountain torrents enter the sea on the east and west.

The **Tiber** flows through a high and narrow valley, which gradually opens out near the sea. The river is chiefly of importance from its historical association with the city of Rome. It is now proposed to cut a ship canal from Rome to the sea.

The **Arno**, 150 miles, which flows through a pleasant valley, has **Florence** and **Pisa** on its banks.

FERTILITY OF SOIL.—Nearly half the country is cultivated, and the remainder is made up of pasture, forests, and waste lands in the mountain regions. The fertility varies greatly; the soil being extremely rich in the northern plain and generally so in the lower valleys, but only moderately fertile on the higher lands. Irrigation is practised with striking success in Lombardy, where the waters of the Po are distributed by canals over a large district. In this region large quantities of rice and enormous crops of grass are grown, the latter producing four, or even more, crops per annum.

The great majority of the people are engaged in farming; and, though the methods employed are often unscientific, the total produce is very great. The subdivision of the land into small farms under peasant proprietorship is the custom throughout almost all the country.

PRODUCTS.—1. **Agricultural.**—1. **Wine** is the most valuable of all the agricultural products, but is not remarkable for excellence. The most famous wine districts are the **West of Sicily**, **Tuscany**, and **Piedmont**.

2. **Wheat** is largely produced, though not in sufficient quantities for the needs of the people. **Maize**, **pulse**, **rice**, **oats**, **barley**, and **rye**.

3. The **olive** is cultivated, both as an article of food itself and for its oil, and is very important.

4. **Hemp**, **flax**, **cotton**, **tobacco**, **chestnuts**, and **fruits**.

5. **Cheese**, known as **Parmesan** and **Gorgonzola**, is largely produced in Lombardy.

2. **Animal.**—**Cattle**, **sheep**, **goats**, and **swine** are kept in large numbers.

Many Swiss cows are imported into the rich pastures of Lombardy, where they produce larger quantities of milk than the native cows. The sheep of the southern mountain regions are migratory, like those of Spain, passing to the high pastures in the summer.

Poultry are also very numerous, and there is a large export of eggs.

Silk cocoons are largely produced in Lombardy and Piedmont, three-fourths of the European silk being Italian. In all parts of Italy the mulberry tree is largely grown for the rearing of the silkworm. Italy exports much raw silk to France.

3. **Fishing** for coral and sponges, tunny and other fishes, employs many men.

4. **Mineral**.—The most valuable mineral of Italy is sulphur, which is chiefly obtained in Sicily.

Coal is very deficient, that which is found being chiefly brown coal (lignite) and anthracite. This has the effect of hindering the manufactures of metal.

Excellent **iron-ore** is worked in Elba and exported. **Zinc** and **lead-ores** are abundant. **Mercury, copper, &c.**, are also obtained. **Marble** of a beautiful kind for statuary is abundant, and is largely worked at **Carrara**.

MANUFACTURES.—The chief are silk and artistic articles, viz. : Lace, glass, earthenware, mosaics, sculptures, carved wood-work, straw-plaiting, coral work, and shell cameos.

Other manufactures are iron, cotton and woollen goods, and cutlery.

Silk.—Italy produces the largest amount of raw silk in Europe but a relatively small quantity of finished silk goods; the raw and thrown silk being chiefly exported. The industry is carried on at **Milan, Genoa, and Bologna**. **Lace** and **glass** are manufactured at **Murano**, near Venice. **Earthenware** and **mosaics** at **Florence**. **Cameos, &c.**, at **Naples**. **Straw-plaiting** in **Tuscany** at many places. **Cutlery** at **Milan**. **Iron** at **Terni**, in the basin of the Tiber, and at **Naples**. **Cottons** and **woollens** at **Biella**, in Piedmont.

The scarcity of fuel causes the utmost use to be made of water-power. Hence the rising textile industries are mostly carried on at the base of the Alps or Apennines.

TRADE.—During recent years a great expansion of Italian trade has taken place. The **Suez Canal** and the construction of the Alpine railway tunnels have largely contributed to this growth. The traffic northwards by the Alpine railways has greatly increased to the detriment of the maritime commerce.

MEANS OF INTERNAL COMMUNICATION.—Except in the north, the **rivers** are of small account in commerce. The Po and other rivers of the plain afford ready means of communication with all parts of Lombardy. The **canals** are generally used for irrigation. The northern plain is well supplied with **railways**, but in the peninsula the lines mostly follow the coasts, with branch lines inland; and, though the passes of the Apennines are comparatively easy, the actual connections between the eastern and western railway systems are few.

The construction of the **Mont Cenis** and **St. Gothard Tunnels** has placed the Italian railways in communication with those of Central and Northern Europe. The **roads**, except where they follow the old Roman roads, are mostly bad, especially in the mountain regions.

One of the most famous roads is the **Emilian Way**, which runs from **Rimini** by way of **Bologna**, **Modena**, and **Parma** to **Piacenza**, and is now accompanied by a railway. The chief trade centres are at **Turin**, which is on the route to the **Mont Cenis Tunnel**; **Milan**, which communicates directly with the **St. Gotthard Tunnel**; and **Piacenza**, which is at a point where the **Po** can be easily bridged.

FOREIGN TRADE.—Imports.—The most valuable are raw cotton, coal and coke, boilers and machinery, raw silk, iron and steel goods, wheat, timber; wool, silk, and woollen manufactures; cattle, hides.

Exports.—Silk (raw and manufactured), cotton yarns, olive oil, dried fruits, wine, hemp, cheese and eggs, sulphur, hides.

Italy sends to the United Kingdom fresh fruit, hides, chemicals, hemp, dye-stuffs, &c., and receives coal, iron-work, machinery, chemicals, cotton and woollen goods.

The foreign trade is chiefly with the United Kingdom, the United States, Germany, France, Austria-Hungary, and Switzerland.

SEAPORTS.—**Genoa**, **Naples**, **Messina**, **Palermo**, **Leghorn**, **Trieste**, and **Venice** are the chief in order of tonnage of vessels entering and leaving.

Others are **Brindisi**, a mail port especially for the East Indies; **Marsala**, **Girgenti**, and **Catania**.

Genoa (300) and **Venice** (171) in the Middle Ages were emporiums for the commerce of the Eastern Hemisphere and two of the most important in Europe; but both decayed after the discovery of America and of the route to the East Indies by the Cape of Good Hope and the development of English commerce. Both cities have revived considerably in recent years. **Venice** has the largest export and **Genoa** the largest import trade of the Italian ports. **Genoa** suffers from the competition of the railways, which cause the bulk of Italian produce to be carried northwards through the Alpine tunnels; and hence vessels arriving with cargo often have difficulty in obtaining outward freight.

Naples (780), the largest city in Italy, has a large import of cereals and manufactured goods. **Leghorn** is the port for Florence and Pisa. **Spezia** is the chief naval port of Italy. Of the Sicilian ports, **Palermo**, **Messina**, and **Marsala** export wine; **Girgenti** and **Catania** export sulphur.

PROVINCES AND TOWNS.—United Italy consists of a large number of States, which, till the second half of the nineteenth century, were either independent or under the rule of other Powers. These old States are now called **Compartimenti**, and are divided into sixty-nine provinces, which are the legal divisions for purposes of government, though the ancient names are still used, as in Spain.

1. The **Northern Compartimenti** (taking 44° N. lat. as a dividing line) are **Piedmont**, **Liguria**, **Lombardy**, **Venetia** (**Venice**), and **Emilia**.

These provinces embrace the whole of the great northern plain, and have a dense population, the average per sq. mile being about 400, that of the province of Milan (1,221 sq. miles)

alone being 1,560. In these plains are numerous ancient towns, some of which are now becoming centres of manufactures and trade. The extreme fertility of the soil causes a vast number of people to be employed in agriculture. The cities of these provinces have taken a leading part in the religious, intellectual, political, and commercial life of Italy and of Europe, and abound with splendid cathedrals and churches, containing priceless works of art.

Padua (112), **Bologna** (211), **Pavia** (40), **Turin** (502), and **Verona** (92) are the seats of ancient and famous Universities, that of Bologna having had during the Middle Ages as many as 10,000 students at one time. **Venice** (171), **Milan** (718), **Parma** (58), with whose names are inseparably connected **Titian**, **Leonardo da Vinci**, and **Correggio** respectively, are famous in art. **Pavia**, from its strategical position, has been the scene of many battles. **Mantua** (36), **Verona** (92), **Peschiera**, and **Legnago** form the famous quadrilateral of fortresses in the lines of defence produced by the marshes of the **Adige** and **Mincio**. **Ravenna** was the capital of some of the later Roman emperors after the great invasion by the Goths, and was an important seaport, but is now an inland town. **Venice** and **Genoa** (300) were the capital cities of famous republics, with colonies and settlements in distant lands. They were also great trading and banking communities, and now possess many industries. **Milan**, **Parma**, and **Modena** were the capitals of grand duchies of the same names. **Milan** is the chief manufacturing city of Italy. **Trieste**, ceded by Austria in 1919.

2. The **Compartimenti** of the Peninsula are **Umbria**, **The Marches**, **Tuscany**, **Roma**, **Abruzzi e Molise**, **Campania**, **Apulia**, **Basilicata**, and **Calabria**.

In these provinces the population is mainly centred in towns, even the farming classes living in towns and going to and from their plots of land. In only one province does the population fall below 100 per sq. mile (a mountainous part of Tuscany), whilst in **Napoli**, or **Naples** (350 sq. miles), the population is 4,257 per sq. mile, and many provinces have about 300 per sq. mile. Though the bulk of the people are engaged in farming, there are a good many domestic industries and some few important manufacturing towns.

Many ancient cities exist, of even greater antiquity than those of the North *e.g.* **Capua**, once the capital of Campania. **Herculaneum** and **Pompeii**, destroyed by **Vesuvius** in 79 A.D. **Siena**, once an important republic and the home of a famous school of painters. **Pisa**, once a powerful republic and trading city, now decayed, and noted chiefly for its **Leaning Tower**.

Rome, on the **Tiber** (691), the most famous city of Europe, is said to have been founded in the eighth century B.C. It became the capital of the Roman Empire, and afterwards the home of the Popes and the centre of Christianity. Since 1870 it has been the capital of Italy, in succession to Florence. It possesses many historic buildings, of which the **Coliseum**, the **Pantheon**, **St. Peter's Cathedral**, and the **Forum** are conspicuous. The city is much visited by artists and others from the whole civilised world because of its art treasures.

Florence (253), on the **Arno**, situated in a fertile plain, is a relatively modern city. It was at its greatest in the fifteenth and sixteenth centuries, when it was the centre of an independent republic. It is now an important city, with manufactures of mosaics, jewellery, and silks. With Florence are connected the names of Dante, the poet; Savonarola, a great preacher; Fra Angelico and Michael Angelo, the great painters.

Naples (780), beautifully situated upon the Bay of Naples, is the largest city of Italy. In the older portion the streets are narrow and the buildings of little note, but the newer portion of the city is handsomely built. Naples was the capital of the kingdom of Naples until 1860, when that kingdom ceased to exist. It is now an important port, with great imports, and has some manufactures, notably of coral. The city bears a bad reputation for its unhealthiness.

SICILY, in area 9,936 sq. miles, is a populous and fertile island, with over $3\frac{1}{2}$ millions of inhabitants, or about 360 to a sq. mile. The chief mineral is sulphur, which is very abundant. The island is the seat of a very ancient civilisation, many cities having been founded by colonies of Greeks and Carthaginians. A great struggle, known as the **Punic Wars**, between Rome and Carthage was waged in and around Sicily in the third century before Christ. The chief cities are **Palermo** (400), **Catania** (255), and **Messina** (176), which are all seaports.

SARDINIA, area 9,306 sq. miles, is a mountainous island, with a population of 860,000, or about 92 to a sq. mile. The soil, which is fertile in places, is not well cultivated. The chief vegetable products exported are oranges and other fruits. Minerals are abundant, lead and zinc being worked. The chief town is **Cagliari** (60), a thriving town with a University. Sardinia, like Sicily, has a very ancient and varied history, having been held by Phœnicians, Carthaginians, and Romans, and later by Saracens and Pisans.

POPULATION.—38 millions, or 329 to a sq. mile. The population is very evenly distributed, especially considering the mountainous character of the country, and there are no great clusters of manufacturing towns as in England, France, Belgium, and Germany.

THE PEOPLE.—The Italians, though very much alike in appearance, character, and customs, are the result of the union of many races.

GOVERNMENT. A Limited Monarchy, with two Houses of Parliament. The Upper House, or **Senate**, consists of royal princes, together with an unlimited number, nominated by the King, of high officials, men famous in science, literature, or any other pursuit tending to the benefit of the nation, and, lastly, the richest men.

The Lower House consists of deputies elected by citizens over twenty-one years of age, who can read and write and who pay certain amounts in taxes. The deputies are unpaid, but are allowed to travel free on Italian railways or steamers.

FOREIGN POSSESSIONS.—On the African coast of the Red Sea Italy possesses the Colony of **Eritrea**, having an area of 45,000 sq. miles; its capital is **Massowah**. Also **Italian Somaliland**, having an area of 130,000 sq. miles. **Tripoli** and **Benghazi** in Northern Africa.

MALTA (British), with the adjoining islands of **Gozo** and **Comino**, is situated in the Mediterranean Sea between Sicily and Africa. Total area, 118 sq. miles; population, 213,000, or over 1,800 per sq. mile.

Valetta (26), the capital, a strongly fortified city, has one of the finest harbours in the world, and, being half-way between **Gibraltar** and **Port Said**, is a most important port of call for vessels.

Malta is the head-quarters and repairing station of the British fleet in the Mediterranean. .

PEOPLE.—Mostly of Semitic origin, speaking a peculiar language allied to Arabic and ancient Carthaginian: the upper classes mostly speak Italian.

INDUSTRY.—The bulk of the population are employed in connection with the shipping; about 5,000 in **Gozo** make **Maltese lace**. The islands are very highly cultivated, and produce corn, cotton, early potatoes, oranges, grapes, and melons.

Citta Vecchia ('Old City'), the former capital, is the only other town of importance.

GOVERNMENT.—The Governor, who is appointed by the Crown, is assisted by an Executive and a Legislative Council, the latter of which consists partly of elected members.

CLIMATE.—Hot summers and mild winters.

EXAMINATION PAPERS

- A. 1. Describe the relief of Italy, showing the exact position of the high and low lands, and naming the mountain ranges, with chief heights.
2. Give an account of the fertility of the soil in various parts of Italy, and name any local causes affecting the same.
3. Mention the chief manufactured products, and connect them, as far as possible, with districts and towns.
4. Name the chief seaports of Italy, with any peculiarities in their trade, and show how historical events or engineering works have affected certain of them.
- B. 1. Name the chief rivers and lakes of Italy, with their position, and describe the Po, drawing a sketch-map.
2. Name the mineral products of Italy, and mention places where any of them abound.
3. Name the provinces of the northern part of Italy.
4. Give some account of Rome, Venice, Naples, Florence, and Milan.

- C. 1. Describe the climate of Italy, and show how it is affected by the position of the country.
2. Show how rivers, canals, roads, and railways are utilised in Italy for the furtherance of commerce.
3. What parts of Italy are most thickly peopled, and why?
4. Show how Italy is governed.

BALKAN PENINSULA

GENERAL DESCRIPTION.—This is the most eastern of the three great peninsulas of Southern Europe, and, like the **Italian** and **Iberian** Peninsulas, has an elevated surface. This peninsula comprises a number of States, which were once part of the Turkish Empire, but most of which are now independent. The inhabitants are of many races and religions, and often bitterly hostile to each other. The population is scanty, and the many natural resources of the country are but slightly developed. In consequence of its elevation, the Peninsula resembles Spain in having very cold winters; but the rainfall is generally sufficient, and the soil is fertile. It is a land of rapid streams, which are of very little service in commerce. Greece, the southern portion, has played a great part in the history of civilisation.

STATES.—**European Turkey**, forming part of the Turkish Empire. The **Kingdoms of Greece, Albania and Bulgaria**. The new State of **Yugo-Slavia**, which embraces **Serbia, Montenegro, Bosnia and Herzegovina**.

SIZE.—**European Turkey**, area 10,882 square miles; **Greece**, area 16,900 square miles; **Yugo-Slavia**, area 100,000 square miles; **Bulgaria and Eastern Roumelia**, area 39,800 square miles.

Greatest length, about 570 miles, from **Cape Matapan** to the **Danube** in a line directly to the north.

Greatest breadth, about 440 miles, in the latitude of **Constantinople**.

RELIEF.—The greater part of the peninsula is elevated land, consisting in places of mountain chains springing from the plains, but mostly of high plateaux, upon which are many ranges and groups of mountains.

The **Balkan Range** is the most important mountain mass, running east and west, and resembling the Pyrenees in the great height and difficulty of its passes. The greatest elevation is about 8,000 ft.

The **Rhodope Mountains**, or **Despoto Dagh** (7,000 ft. the highest point), lie south of the parallel with the Balkans. This range joins the Balkans in the west, and the two ranges become merged in the great mass of elevated land which fills the western portion of the peninsula. In the western half of the peninsula are many ranges, whose direction is generally north to south;

but no range is very distinct except in the south, where Mount **Pindus** extends into Greece, and in the north, where the **Dinaric Alps** connect the Balkan and Alpine system. In about the middle of the western mass is **Shar Dagħ**, a short range, with an elevation of 10,000 ft., the highest in the peninsula.

The famous **Mount Olympus**, nearly 10,000 ft., is in the south of Macedonia.

The southern part of Greece (Morea) has a rim of high mountains enclosing the tableland of **Arcadia**, the chief range being Mount **Taygetos**.

Mount Parnassus, 8,000 ft., is prominent to the north of the Gulf of Corinth.

PASSES.—The most celebrated pass in the Balkans is the **Shipka**, 4,400 ft. high. This was unavailingly defended by the Turks against the Russians, with immense loss on both sides, in the Russo-Turkish War of 1877-78.

Pass of Thermopylæ, in the northern portion of Greece, famous for its heroic defence by Leonidas with 300 Spartans against a great army led by Xerxes.

PLAINS.—The **Bulgarian Plain**, to the north of the Balkans, is the most extensive. The **Valley of the Maritza**, in **Eastern Roumelia**, is also of considerable size.

Thessaly contains some extensive wheat-growing valleys.

Lowlands of less extent lie near Constantinople; also in the north of **Servia**; and there is a strip of coast land in the west.

LAKES.—The peninsula has a few lakes, widely scattered. The best known is **Lake Scutari**, between Montenegro and Albania.

This was formerly reached by sea-going vessels, but the channel of its outlet, the **Boyana**, is now blocked.

Lake Ochrida, on the Albanian Plateau, is the source of the **Black Drin**. **Lake Yannina**, also on this tableland, has a subterranean outlet.

COAST-LINE.—The coast-line, except in the Black Sea, is remarkably indented, especially in Greece and Macedonia, and abounds with islands lying at short distances from the shore.

These islands are all mountainous, and are of the same formation as the highlands of the mainland. Navigation amongst the islands is generally difficult. Greece is almost cut into two portions by the **Gulfs of Corinth** and **Ægina**, the isthmus between being only 4 miles across, and this now has a ship canal cut through it.

CAPES.—The most famous cape is **Matapan**, in Greece.

SEAS, OPENINGS, AND STRAITS.—**West Coast.**—**Adriatic Sea**, narrowing opposite **Cape di Leuca** into the Channel of **Otranto**; **Gulf of Arta**: **Gulf of Patras**, leading into **Gulf of Corinth**.

East Coast.—**Ægean Sea**, between Greece and Asia Minor, with Gulfs of **Nauplia**, **Ægina**, **Volos**, and **Salonika**; Channel of **Euripus**, between the island of **Negropont**, or **Eubœa**, and the mainland. Between the **Ægean Sea** and the **Sea of Marmora** is the Strait of **Dardanelles**, or **Hellespont**; and between the **Sea of Marmora** and the **Black Sea** is the Strait of **Bosporus**.

ISLANDS.—These are in two groups:

(a) The **Ionian Islands**, on the west.

(b) The **Archipelago**, in the **Ægean Sea**.

Ionian Islands.—The chief in order of size are: **Corfu**, **Cephalonia**, **Zante**, **Santa Maura**, **Cerigo**, and **Ithaca**, with a total area of 950 sq. miles.

All these islands are mountainous, with heights varying from 3,000 to 5,000 ft., and the valleys are fertile and productive.

Greek Archipelago.—This is in two divisions:

(a) The **Cyclades** (Gr., *kyklos*, a circle), which were supposed by the ancient Greeks to form a circle round the sacred island of **Delos**. Some of the chief of this group are **Syra**, **Milos**, **Paros**, and **Naxos**.

(b) The **Sporades** (Scattered Isles), **Negropont**, the largest Greek island, **Samothrace**, **Lemnos**, and **Thaos**.

Candia lies to the south of the Archipelago, and is larger than any of that group, being in length 160 miles, and having an area of 3,326 sq. miles. It is a mountainous island, **Mount Ida**, 8,000 ft., being the most famous peak; and the soil is fertile.

CLIMATE AND RAINFALL.—Considering its southerly latitude, and the nearness of so much of its surface to the sea, the Balkan Peninsula experiences great extremes of temperature. This is due, first, to the general elevation of the surface; and, secondly, to its exposure to the cold north-east winds from Russia.

The rainfall is generally fairly abundant and equally distributed, except in Greece, which suffers from very dry summers.

Constantinople, though in the same latitude as **Naples**, has a winter temperature of 10° less than that of **Naples**. Consequently, the olive will not flourish in the neighbourhood of the Turkish capital.

This is due to the want of protection from north-east winds.

RIVERS.—The chief river is the **Danube**, which has already been described in the chapter upon **Austria**. In its lower course are numerous lakes and swamps, together with many channels near the delta. The three chief mouths are the rivers **Kilia**, **Sulina**, and **St. George**. The importance of this river as a highway for nations has already been shown.

In addition to the numerous tributaries of the **Danube** there are many rivers. These are generally rapid, and in the south often dry up in summer.

The **Maritza** drains the southern side of the **Balkans** and the **Despoto Dagb**, and waters the extensive plain of **Roumelia**, entering the sea to the west of the Sea of **Marmora**.

The **Vardar** has its sources in the **Shar Dagb** and neighbouring mountains, and enters the Gulf of **Salonika**.

The **Black Drin** rises in Lake **Ochrida**, and flows into **Montenegro**, joining the **Boyana**, the outlet of Lake **Scutari**.

The **Strouma** and the **Kara Su** run southwards, parallel with the **Vardar**.

The rivers of Greece are of more fame in ancient history than in modern commerce. The only navigable river is the **Salambria**, which drains the east of **Mount Pindus**, and flows through the **Vale of Tempe** to the sea.

FERTILITY OF SOIL.—Generally speaking, the soil is fertile, and in places extremely so, especially in the plains and the sheltered valleys. The uplands of Greece, being exposed to extremes of heat and cold and having little rainfall, produce only a thin herbage. Large forests of beech, oak, firs, and pines exist in the mountain regions of the centre and north, but they are rapidly being cut down. In all parts the system of agriculture is very primitive.

PRODUCTS.—1. **Agricultural.** (a) **General.**—Maize and all European cereals, tobacco, cotton, vine, and fruits.

Wine is largely exported for mixture with other wines.

(b) **Special.**—GREECE.—Currants, figs, and olives.

ROUMELIA.—Roses, for the extraction of attar of roses.

SERBIA.—Plums; these are dried and exported in large quantities.

TURKEY.—Coffee, madder, opium, and gums.

All the States of the Balkan Peninsula are almost entirely agricultural or pastoral; but agriculture is much retarded by lack of roads and means of conveyance, which renders competition with other nations difficult. The land is generally held in small plots by peasant proprietors.

2. **Animal.**—Horses and cattle are the chief, and are reared in large numbers in the plains of the **Danubian States**. Sheep are reared on the uplands of Greece and Serbia, and in Bulgaria. Goats exist in Greece in very large numbers, and are almost wild. Pigs in vast numbers in the beech forests of Serbia. Mules and asses in Greece. Silk is produced in large quantities in Turkey, Bulgaria, and Greece.

3. **Fisheries.**—The fishing industry in the **Ægean Sea** is most valuable and important. In addition to fish, a large quantity of sponges is obtained.

4. **Mineral.**—The whole peninsula is rich in minerals, but the industry is undeveloped. Greece alone has any considerable export of minerals, these being found near the coasts.

TURKEY.—Coal is abundant, but little worked; copper, lead, silver, iron, and many others also abound.

GREECE.—Iron-ore, silver and lead, statuary marble, and zinc.

SERBIA.—Coal, iron, lead, copper, and many other minerals are abundant, but are little worked.

BULGARIA.—Coal, iron, and salt.

MANUFACTURES.—Throughout the peninsula manufactures are unimportant, and in many parts can hardly be said to exist.

Turkey carpets are made at **Salonika** and some other places, and form a valuable export. There are besides some light cotton goods made, and copper and brass are turned into household utensils.

TRADE.—Internal trade is much hindered by the difficulties of communication. The wants of many of the people are also very simple, and consequently the demand for foreign goods is relatively small; though, doubtless, an increasing knowledge of Western products will lead to a greater import. An extensive shipping trade with **Western Europe**

FIG. 171.—GREECE.



is carried on at the ports of the seaboard and of the Danube, the chief carrying trade being in British ships. A large quantity of **Asiatic** produce is exported through Constantinople. A large part of the Turkish trade is with the United Kingdom. The Greeks have an extensive carrying trade in the **Levant** and **Black Sea**.

MEANS OF INTERNAL COMMUNICATION.—The rivers, except the Danube, are of little or no use in commerce. The mountainous character of the surface and the height of the passes cause roads and railways to be difficult of construction. Nature has marked out two great trade routes between the north and the south of the Balkan system:—

(a) Up the valley of the **Morava** from Belgrade, and down that of the **Vardar** to Gulf of **Salonika**.

(b) From **Nish**, south-eastward over the watershed, and down the **Maritza** to **Adrianople** and **Constantinople**.

Since 1888 Constantinople and Salonika have been connected by these routes with the railway system of Western Europe.

The town of **Nish** is likely to attain great importance as a railway centre. Other trade centres are **Sophia** in Bulgaria, **Adrianople** in Turkey, **Philippopolis** in Eastern Roumelia, **Scutari** and **Yannina** in Albania, and **Belgrade** in Serbia.

In Greece the roads have been improved in recent years. Turkey has about 1,200 miles of railway open, and Greece 700 miles. Serbia has the advantage of three navigable rivers, the **Danube**, **Sava**, and **Drina**. The only canal of importance is the ship canal between the Gulfs of **Corinth** and **Egina**.

FOREIGN TRADE.—Imports.—**TURKEY.**—Cotton goods are by far the most important, and the bulk comes from Great Britain; sugar, coffee, woollens, linen, petroleum, and rice. Others are iron goods and machinery, flour and leather.

GREECE.—Cereals, cotton goods and yarn, woollens, coal, iron and machinery are the chief. Others are timber, chemicals, fish, animals, hides, coffee, sugar, and rice.

The United Kingdom, Russia, France, and Austria-Hungary send most of the Greek imports.

YUGO-SLAVIA.—Cotton goods, the most important; metals, leather, woollen goods, and tropical produce.

Austria-Hungary sends most of these.

BULGARIA.—Cotton and woollen goods; chemicals, metal goods, and machinery.

Austria-Hungary and the United Kingdom send most.

Exports.—**TURKEY.**—Silk, barley, and raisins are the chief; tobacco, opium, wool, wine, coffee, olive oil, figs, sheep- and goat-skins, carpets, various fruits and nuts, and drugs.

The United Kingdom, France, Austria-Hungary, Germany, and Italy are the chief receivers of these.

GREECE.—Currants, the staple product and export; metal ores, olive oil, wine, tobacco, sponges, figs, and olives.

The currants exported to the United Kingdom form about two-fifths of the total value of the exports.

YUGO-SLAVIA.—Agricultural products, as wine and plums; animals, as sheep, cattle, and pigs, and their products; and barrel staves.

BULGARIA.—Wheat, the chief; wool, tallow, butter, cheese, hides, flax, and timber.

France, the United Kingdom, and Turkey take the bulk.

SEAPORTS.—In **TURKEY.**—Constantinople (1,200), and Gallipoli.

In **BULGARIA.**—Varna.

In **GREECE.**—Piræus, the port of Athens (more than one-half of the trade is through this port), Volos, Patras, Corfu, Zante, and Hermupolis, on Syra Island. Salonika. Smyrna, in Asia Minor.

In **MONTENEGRO.**—Antivari and Dulcigno.

Constantinople has an extensive trade with Western Europe and with the various countries forming the Turkish Empire. A large part of the commerce of Asia Minor is carried on through this port.

Salonika is next to Constantinople in commercial importance, and third in size. Since the construction of the railway from Belgrade through Nish to Salonika, this port has become an important post on the shortest route to Egypt from the north and west of Europe.

Patras is the chief port for the export of currants.

Hermupolis is a very important commercial centre.

STATES AND TOWNS.—The **TURKISH EMPIRE** embraces an area of about 600,000 sq. miles in Europe and Asia. The chief parts of the Empire are: European Turkey, and parts of Asia Minor, and Armenia.

POPULATION (in Europe).—About 2 millions, or 180 to a sq. mile. Turks, Greeks, and Albanians exist in almost equal proportions, together with Serbs, Bulgarians, Rumanians, Armenians, Magyars, Gypsies, and Jews.

Constantinople (1,000) is the chief city of European Turkey, and is also the largest port and the capital of the whole Turkish Empire. It is splendidly situated on the Bosphorus, with an excellent natural harbour, the Golden Horn. A port has stood on this site since very remote times, a settlement having been made there by the early Greeks in the seventh century B.C. Constantinople possesses many handsome mosques and other buildings, and presents a very beautiful aspect when viewed from the sea, but many of the streets are narrow, crooked, and dirty. The most famous building is the Mosque of St. Sophia.

Note.—The Bosphorus has been placed under the League of Nations.

Adrianople (50), on the Maritza, is the second largest town, and is a place of important trade. Gallipoli, on the Dardanelles, is the chief naval port.

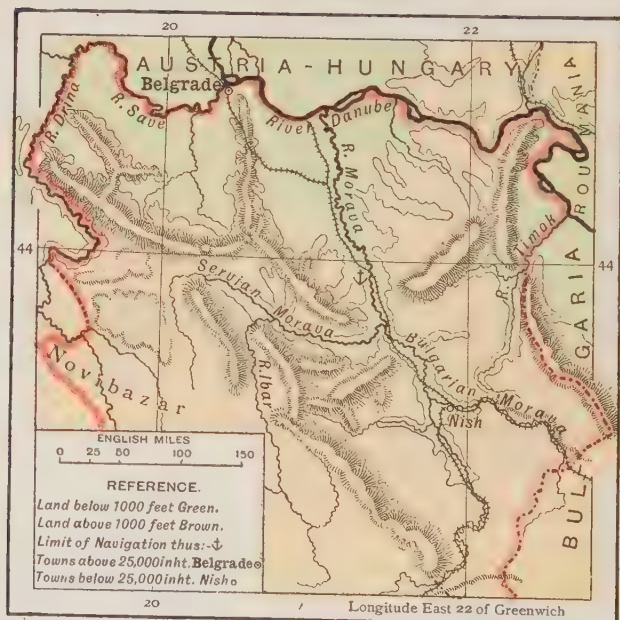
GREECE, or the Kingdom of the Hellenes, consists of Macedonia, Epirus, the Ægean Islands, and Thrace.

The province of Thessaly is the most productive portion of the dominions of the King of Greece.

POPULATION.—About 2,600,000 of mixed Hellenic and Albanian race.

From the nature of the country, with its great extent of coast-line and comparative barrenness, the Greeks have always been more noted as sailors and traders than as agriculturists, and they now hold a very large share of the trade of the Mediterranean and Black Seas.

FIG. 172.—SERBIA.



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Athens (292) is the capital. In the days of the early glory of Greece, Athens was a famous city, and it is still the centre of the intellectual life of the nation. It possesses many beautiful and famous ruins of temples and other buildings, of which the finest are on the Acropolis, a steep rock rising from the plain upon which the city stands.

Salonica (170) an important seaport ceded from Turkey to Greece in 1913.

Piræus (131) is the third largest town, and is the port of Athens. Other towns of modern importance are **Patras** (52), from which the currants are chiefly exported.

Hermupolis (18), on Syra, is a much frequented coaling port, a centre of trade, and the seat of a University.

Corfu (27), on the island of that name, is a seaport and a University town. **Zante**, on Zante Island, is much subject to earthquakes. **Larissa** is the chief town in Thessaly. Ancient famous towns, now decayed, are **Corinth**, **Olympia**, **Sparta**, and **Argos**.

YUGO-SLAVIA, the country of the Serbs, Croats, and Slovenes, is a mountainous and well-watered country to the west of Bulgaria. It consists of Serbia, Montenegro, Bosnia, and Herzegovina and other districts. The area is 100,000 square miles, and the population over 14 millions.

FIG. 173.—BULGARIA.



The people are mostly of the Serbian branch of the Slav race, but there is a considerable admixture of Rumanians, Gypsies, Germans, and other foreigners. The natural resources of the country, both vegetable and mineral, are great; but the latter are undeveloped, and the great bulk of the people are occupied with agriculture. Manufacturing industry is in its infancy.

The chief towns are—**Belgrade** (120), the capital, a strongly

fortified town at the junction of the Save and Danube ; **Nish** (24), a town of rising commercial importance at the meeting of the railways from **Constantinople** and **Salonika**.

BULGARIA, with which is united **Eastern Roumelia**, is bounded by the **Danube** on the north, by the **Black Sea** on the east, **Greece** on the south, and **Yugo-Slavia** on the west.

The district called **Dobruja**, between the delta of the Danube, the great northerly bend of that river, and the Black Sea, is Rumanian territory.

The northern part of Bulgaria lying along the Danube valley is a fertile plain, which is separated from the plain of Roumelia by the Balkan Mountains. The climate is hot in the summer but the northern part is very cold in winter. The total area of the two States is 39,800, with a population of about $4\frac{3}{4}$ millions, or nearly 110 to a sq. mile. Three-fourths of the inhabitants are **Bulgars** (Slavs), and there are over 500,000 Turks, with a considerable number of **Greeks**, **Jews**, **Gypsies**, &c. The great majority of the people live by agriculture and by the rearing of flocks and herds. **Sophia** (154) is the capital, and **Philippopolis** (46), the former capital of Eastern Roumelia, is the next largest town. Several considerable towns—viz. **Ruschuk**, **Silistra**, **Nikopoli**, and **Vidin**—stand on the right bank of the Danube, which is high, and not subject to inundation as the left bank is. **Varna**, on the Black Sea, is the chief port. **Plevna**, on the plain south of the Danube, was bravely held by the Turks against the Russians in 1877.

MONTENEGRO is a small mountainous country, south-west of Herzegovina, inhabited by a Serbian people who have always maintained their independence against the Turks. The area is 3,700 sq. miles, and the population about 199,000. The soil is not very productive, and is badly tilled. The chief products are maize, oats, potatoes, and vine. The exports are mainly the produce of the flocks and herds, together with shumac. The capital is **Cetinje** (4), but the largest town is **Podgoritza** (10).

Montenegro now forms part of the new State of Yugo-Slavia.

SAMOS, now incorporated with Greece, is an island off the coast of Asia Minor. The area is 180 sq. miles, and population 63,000. The **exports** are wine, grapes, hides, and oil. The **imports** are wheat, flour, and textiles. Considerable trade is carried on with Great Britain.

EXAMINATION PAPERS

- A. 1. Give an account of the mountain system of the Balkan Peninsula, showing direction and heights of the various ranges.
2. Name the chief islands belonging to Turkey and Greece respectively, and classify them in groups.
3. Name the States in the Balkan Peninsula and their capitals, indicating the position of the latter.
4. What are the causes that have prevented Greece from becoming a manufacturing country?
- B. 1. Describe a coasting voyage from Varna to Piraeus, naming the capes, openings and seas, and the ports passed on the way.
2. Show how the climate of the Balkan Peninsula is affected by the elevation of the surface.
3. Name the chief seaports in Turkey, Greece, and Bulgaria, and indicate any special trade connected with them.
4. Explain why the winter climate of Turkey is so much more severe than western France.
- C. 1. Describe the river system of the Balkan Peninsula, showing the direction of the watersheds, naming the chief rivers and showing their peculiarities.
2. Name, firstly, the general agricultural products of the Balkan countries; and, secondly, any products that are peculiar to certain States.
3. Give a brief account of Bulgaria, showing its position, relief, rivers, products and industries.
4. Name the principal imports and exports of Turkey.
- D. 1. Show the commercial facilities of the Balkan Peninsula, especially indicating how the natural features aid or hinder communication.
2. Give a brief account of Serbia, stating particulars as in C. 3.
3. Where and what are Thermopylae, Topolias, Olympus, Nish, Euboea, Matapan, Yannina, Hermupolis, Ida?
4. Give some account of Constantinople, Athens, Zante, Corinth, Salonika, Sofia, Adrianople, Gallipoli, Cetinje.
- E. 1. What fresh territory has Greece gained as a result of the Great War?
2. Draw a sketch map showing what has been lost by Bulgaria.

ASIA

POSITION AND BOUNDARIES.—The mainland of Asia is situated entirely within the Northern Hemisphere. It forms the eastern and larger portion of the great continental mass known as Eurasia, which stretches from the Atlantic to the Pacific.

Asia is bounded on the north by the **Arctic Ocean**; on the east by the **Pacific Ocean**; on the south by the **Indian Ocean**; and on the west by the **Red Sea**, the **Mediterranean Sea**, the **Sea of Marmora**, the **Black Sea**, the **Caucasus Mountains**, the **Caspian Sea**, the **Ural River**, and the **Ural Mountains**.

The line of separation between Asia and Europe is not very strongly marked, the average height of the Ural Mountains being under 2,500 ft. Before the Suez Canal was cut, Asia was united to Africa by the Isthmus of Suez.

SIZE.—Asia has an area of nearly $17\frac{1}{2}$ million sq. miles. It is the largest of the continents, and occupies more than one-half of the Old World.

Its greatest length is 6,700 miles, from East Cape on Behring Strait, long. $169^{\circ} 44'$ W., to Cape Baba in Asia Minor, long. $26^{\circ} 5'$ E. Its greatest breadth is 5,400 miles, from Cape Romania in the Malay Peninsula, lat. $1^{\circ} 22'$ N., to Cape Chelyuskin in Siberia, lat. $77^{\circ} 33'$ N.

RELIEF.—The surface of Asia resembles that of Europe in the fact that the chief elevations lie towards the centre and south, while a great plain extends towards the north. On the other hand, the greater part of the surface of Europe is **below**, while the greater part of that of Asia is **above** 1,000 feet in elevation. This elevated portion consists of a series of extensive **plateaux**, hemmed in and crossed by lofty mountain ranges.

As regards physical structure, the surface of Asia falls into five natural divisions—

1. The **Great Plain** of the North.
2. The **Highlands** of the mainland, stretching from east to west, and occupying the central and a large portion of the southern part of the continent.
3. The **Lowlands** and **coast plains** fringing the highlands on the south and east.
4. The **Tablelands** of Arabia and the Deccan.
5. The **volcanic island chain** lying off the east coast.

1. The **Great Plain** of the North occupies a large portion of Siberia, and is continuous with the great plain of Northern Europe. The Ural Mountains, which run north and south near the political boundary between Asia and Europe, hardly break the continuity of the plain; they are of no great elevation, and rise with a gentle slope on both sides.

2. Like the plain, the great **Highlands** of Asia and Europe are continuous. In Asia they consist of a series of plateaux, varying from 3,000 ft. in the Plateau of Iran to 14,000 ft. in the Pamirs and 17,000 ft. in the Plateaux of Tibet. This region of highlands is crossed, moreover, by some of the highest mountains in the world, so that the general elevation of the whole area, which comprises about half the continent, is very high. This accounts for the fact that the average elevation of Asia is higher than that of any other continent.

The chief centre of elevation is the extensive **Plateau of Tibet**, lying to the north of the Himalayas. This plateau is unprotected on the north from the cold Siberian winds, and the lofty mountain ranges on the south prevent the access of the warm and rain-bearing winds from the Indian Ocean. These facts, together with its high elevation and its inland position, account for the severity of the climate, which supports a scanty vegetation and a thin population.

North-east of Tibet, and separated from it by a slight depression—the Han-Hai, or Dry Sea of the Chinese, lies the vast **Plateau of Mongolia**. From this plateau elevated land extends to the Behring Sea.

On the western side of Tibet, the **Plateau of Pamir**—the 'Roof of the World'—forms the starting point of the great mountain chains of Asia.

(a) The great double chain of the **Himalayas** extends to the south-east for 1,500 miles, separating India from Tibet. They contain the most elevated peaks in the world, **Mount Everest** being 29,000 ft. high.

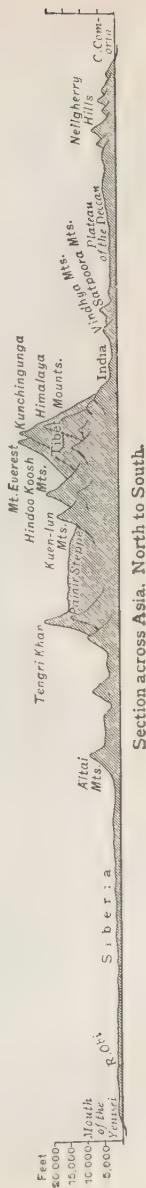
(b) North of the upper course of the Indus are the **Karakorum Mountains**, with **Mount Godwin Austin**, 28,250 ft. in height. Recent exploration has proved the existence of other very lofty peaks, and it is believed that at least one of these is higher than Mount Everest. The range to the north of the upper course of the Brahmaputra has only recently been explored by Dr. Sven Hedin, and the name **Trans-Himalaya** has been given to it.

(c) The **Kuen-lun Mountains** extend eastwards, and form the northern border of Tibet.

(d) The **Thian-shan Mountains** extend to the north-east, and, with the **Altai**, **Yablonoi**, and **Stanovoi Mountains** form a continuous chain stretching to Behring Sea.

(e) The **Hindu Kush Mountains** run westwards

FIG. 174.



from the Pamirs at the point where the Highlands of Asia are narrowest -- only about 300 miles -- and from the beginning of a ridge which skirts the Plateau of Irania on the north and terminates on the shores of the Mediterranean Sea.

FIG. 175.—ASIA: RELIEF.



(f) The **Sulaiman Mountains** extend southwards, forming the eastern boundary of the Plateau of Irania.

The **Plateau of Irania** is continuous westwards with the **Plateau of Armenia** and the mountains of Asia Minor. To the north are two volcanic

ranges—the **Elburz Mountains**, with **Mount Demavend**, an extinct volcano, 19,000 ft. high, and the steep and lofty **Caucasus Range**, with **Mount Elburz**, also volcanic, 18,500 feet in height.

3. The **Lowlands and Coast Plains** varying in width from a narrow strip south of the Plateau of Irania to broad, fertile, and populous plains south of the Himalayas and in the river valleys of Indo-China and China. The principal of these river plains are **Mesopotamia**, in the valley of the Tigris and Euphrates; the plain of **Northern India**, watered by the Indus, Ganges, and the lower course of the Brahmaputra; the plains of **Lower Burma**, **Siam** and **Cambodia**, watered by the Irrawadi, Salwin, Me-nam and Mekong; and the great plain of **China**, watered by the Yang-tse-kiang, the Hwang-ho, and the Amur.

4. The **tablelands of Arabia** and the **Deccan** are separated from the highlands of the mainland by the plains of Mesopotamia and Northern India. The former has an elevation of about 3,000 ft. with a more uniformly level surface than the latter, of which the elevation varies from 1,000 to 3,000 feet.

5. The **volcanic eastern chain** occupies the long line of islands which lock the eastern seas from Kamchatka in the north to the Philippine Islands in the south. The most important and most typical volcano in the chain is Fujiyama, in Japan (12,500 ft.).

DESERTS.—Asia contains large areas of waste land, the chief of which are: The **Desert of Gobi**, the **Indian**, **Persian**, and **Arabian Deserts**, and the **steppes** and **toundras of Asiatic Russia**.

1. The **Desert of Gobi** or **Shamo** lies north of China and Tibet, and is the eastern portion of the area known to the Chinese as the Han-Hai or Dry Sea. It is thinly covered in parts with short grasses, and contains numerous salt lakes. Loose, shifting sands occupy large tracts near the Great Wall of China.

2. The **Indian Desert** extends from the Indus to the Arávali Mountains, and has an area of about 150,000 sq. miles.

3. The **Great Salt Desert of Persia** occupies the eastern portion of the Plateau of Iran.

4. The **Arabian Deserts** cover the greater part of the interior of the peninsula, and are continued to the north as the **Syrian Desert**.

Smaller deserts occur in **Afghanistan**, **Baluchistan**, and **Mesopotamia**.

5. The **Deserts and Steppes of Turkestan** and the **Tundra of Northern Siberia** occupy large tracts of Asiatic Russia.

COAST LINE.—Compared with Europe, the coast line of Asia is relatively not nearly so extensive. Europe has about one mile of coast to 190 sq. miles of surface, while Asia has only one mile of coast to 500 miles of surface. Though the coast is considerably broken up on the east and south, the openings do not run into the continent to the same extent as those of Europe. The outline of Asia resembles that of Europe in the fact that there are three great peninsulas on the south coast of each continent; Arabia, corresponding with the Iberian Peninsula, India and the island of Ceylon with Italy and Sicily, and Indo-China with the Balkan Peninsula.

CAPIES.—The principal points are: **Cape Chelyuskin**, the most northerly cape of the continent; **East Cape**, in Behring

Cape Negrais, in Lower Burma ; **Cape Comorin**, at the south of India ; **Ras-el-Had**, the eastern point of Arabia.

ISLANDS, SEAS, &c.—The northern coast resembles that of Europe. The principal openings are the **Kara Sea** and the **Gulfs of Ob and Yenisei**, which are really the mouths of the rivers Ob and Yenisei. The **Liakof Islands** are noted for the quantity of fossil ivory found there, consisting of tusks of the extinct mammoth.

On the east coast there are five large seas, each shut off from the Pacific by chains of islands.

1. **Behring Sea**, communicating with the Arctic Ocean by **Behring Strait**, and cut off from the Pacific by the **Aleutian Islands**, which stretch from Alaska to Kamchatka.

2. The **Sea of Okhotsk**, with the **Kurile Islands** separating it from the Pacific.

3. The **Sea of Japan**, bounded on the east by the **Japanese Islands**, and communicating with the Sea of Okhotsk by **La Pérouse Strait**.

4. The **Yellow and East China Seas** form one large opening, with the **Riu-kiu Islands** (Lu-chu) between it and the Pacific. It communicates with the Sea of Japan by the **Korea Strait**.

5. The **South China Sea** has the islands of the **Eastern Archipelago** for its southern and eastern boundary, and is connected with the Yellow Sea by the **Channel of Formosa**. It contains the two large **Gulfs of Tongking and Siam**, and is subject to dangerous typhoons.

On the south the Indian Ocean forms two wide openings :

1. The **Bay of Bengal**, which communicates with the China Sea by the **Strait of Malacca**, and which has the **Gulf of Martaban** on its eastern side. It contains the **Nicobar and Andaman Islands**, which stretch from Sumatra to Cape Negrais, and the large island of Ceylon, which is separated from India by **Palk Strait** and the **Gulf of Manaar**.

2. The **Arabian Sea** has two large prolongations towards the north : (1) The **Persian Gulf**, to which access is gained by the **Gulf of Oman** and the **Strait of Ormuz**. (2) The **Red Sea**, which runs for 1,200 miles between Arabia and Africa, and which is connected with the ocean by the **Gulf of Aden** and the dangerous **Strait of Bab-el-Mandeb**. Off the south-west coast of India lie the **Laccadive and Maldivé Islands**.

On the west coast the **Levant** washes the shores of Asia Minor, and contains the important island of **Cyprus**. The rest of the coast is bordered by the **Archipelago**, the **Sea of Marmora**, and the **Black Sea**.

CLIMATES AND RAINFALL.—As the continent of Asia extends from the North Pole to the Equator every variety of

climate is experienced. The latitude is, however, a very uncertain guide to the climate of any particular region, for local influences frequently cause considerable modifications in the climate of places on the same latitude. The chief of these influences in Asia are—

1. The elevation of the interior, which makes a great portion of the continent colder than it would otherwise be.

2. The general direction of the mountain chains from east to west, which prevents the passage of the cold north winds southwards and the warm south winds northwards.

3. The monsoon winds, which account for the rainfall of India and South-Eastern Asia.

4. The slope of the land from the interior towards the Arctic Ocean, *i.e.* away from the sun, which renders the greater part of Siberia cold and unproductive.

5. The compactness of the continent, which removes much of the interior from the influence of sea-breezes, and accounts for the generally deficient rainfall.

Asia may be divided into four great climatic regions—

1. The Northern Region.
2. The Desert Regions.
3. The Mediterranean Region.
4. The Monsoon Region.

THE NORTHERN REGION.—That portion of Siberia which borders the Arctic Ocean is for several months extremely cold, and being inaccessible to any rain-bearing winds it has hardly any rainfall. During the long winter the rivers are entirely covered with ice and the ground is frozen to a depth of several feet; but during the long days of the short summer, when the ice melts, and the thawing of the snows and glaciers of the central highlands causes the rivers to overflow, the ground becomes swampy and a vegetation of mosses and lichens begins to grow. These desolate plains are called **toundras**, and they are found in all the three continents whose lands border the Arctic Ocean.

South of the toundras is a lowland belt of an entirely different character. Here the winters are still severely cold, but owing to the higher altitude of the sun and the dryness of the atmosphere, the summers are much milder. This is the **forest belt**, with evergreen cone-bearing trees in its northern, and deciduous trees in its southern, zone. This part of Siberia is an area of extremes of temperature. At Yakutsk there is a difference of more than 100° F. between the summer and the winter temperatures.

In the south-west of Siberia the winters are still long and cold, but the summers are short and hot, and the climate very dry. Here trees cannot grow, but when, in spring, the sun melts the snow which has covered the ground during the winter, the vast plains become green with pasture, and in the river valleys grain crops are cultivated. This region is called the **Steppes**, the best known of which is the Kirghiz Steppe, between the Sea of Aral and Lake Balkash.

THE DESERT REGIONS.—In the vicinity of the tropics of Cancer and Capricorn two belts of calms encircle the globe, and here rainfall is

generally deficient. In these latitudes, therefore, many of the great deserts of the world are to be found. The chief desert of the northern tropic is the Sahara in Africa, which is continued in Asia across Arabia, Persia, Afghanistan and Baluchistan to the Sind and Thar Deserts in India. These dry lands give out their heat during the night as rapidly as they absorb it during the day, and while the days are hot, it becomes very cold at night. This causes a constant expansion and contraction of the rocks, which in time breaks them up and converts them into sand, hence the deserts of the tropics are mostly sandy wastes.

But the elevation and rainless character of much of the interior of Asia accounts for the existence of many other desert areas which resemble the cold tundras of the north more than the hot deserts of the south. The chief of these are Tibet and the Desert of Gobi, whose mountain walls deprive the prevailing winds of their moisture before they penetrate into the interior.

Another desert occupies the low-lying region to the east of the Caspian Sea, and is called the Desert of Turan. It merges into the steppes on the east.

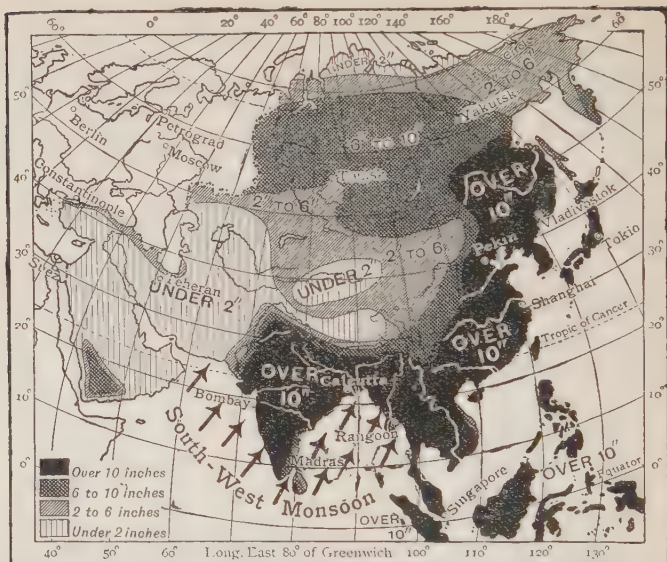
These deserts are by no means uninhabited. In all parts there are isolated streams and lakes which are the mainstay of a scattered population, while where the water supply is constant towns spring up, forming links in the chain of communication and trade routes across barren and inhospitable countries. These cases are often the centres of keen cultivation and simple manufacturing industry.

THE MEDITERRANEAN REGION.—The countries which encircle the Mediterranean Sea in the south of Europe, the north of Africa, and the south-west of Asia form a distinct climatic region. The proximity to the sea causes the climate to be equable and moist, and the latitude renders it mild both in winter and summer. The part of Asia belonging to this region includes Asia Minor, Syria and Palestine on the coast and Armenia, Transcaucasia, a part of Persia and Mesopotamia further inland. As we proceed from the sea towards the interior the height increases and the rainfall diminishes. The climate therefore becomes more extreme, and the Mediterranean region merges almost imperceptibly into steppe-lands near the Caspian Sea, and into desert in Arabia and Persia.

THE MONSOON REGION.—This region extends over the whole of the south-eastern border of the continent from the Arabian Sea to the Japan Islands, and is chiefly characterised by a definite rainy season corresponding to the summer solstice when the sun draws up the rain-bearing trade winds from the Indian and Pacific Oceans. These wet winds are deprived of their moisture by the mountains of the great highlands, and consequently the influence of the monsoon is not felt in the interior of the continent. The chief countries of this region are the Indian Empire, the Indo-China peninsula, the Malay Archipelago, the eastern portion of the Chinese Empire, and the Japan Islands. In the tropical countries the summers are very hot, but further north the winters are cold, and everywhere efforts have to be made to obtain the maximum benefit from the abundant rainfall of the short rainy season.

Irrigation.—The uncertainty of the rainfall in Asia accounts for the irrigation works which have to be resorted to in nearly all parts of the continent. In no part of the world, except perhaps in Australia, is the need for irrigation more keenly felt than in Asia. Remains of ancient systems of irrigation are to be seen in various parts, particularly in Mesopotamia and Siam, where the Euphrates and Tigris and the Me-kong supplied the water for numerous canals.

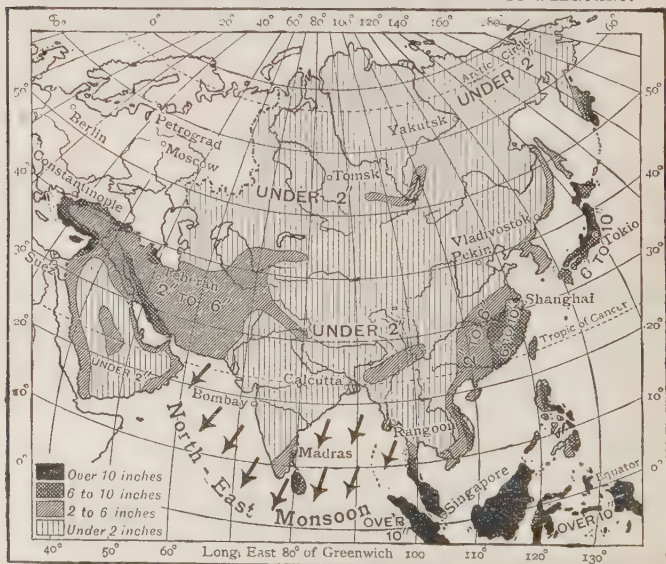
FIG. 177.—ASIA: SUMMER RAINFALL: JUNE TO AUGUST.



after Supan

Emery Walker sc

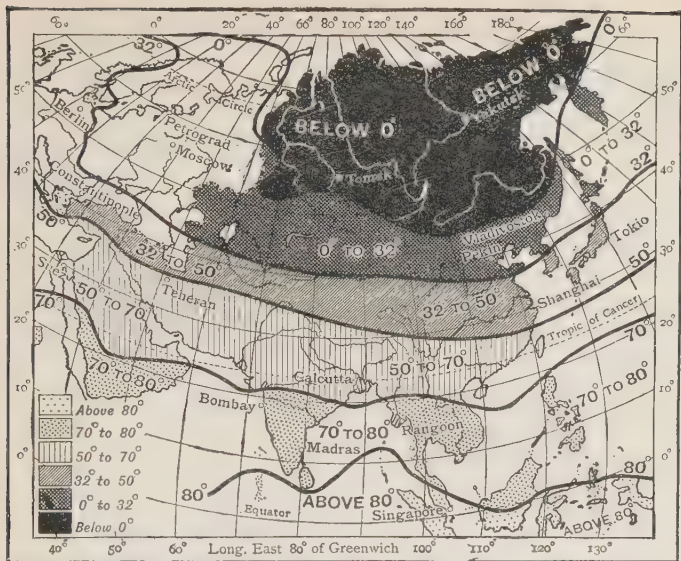
FIG. 178.—ASIA: WINTER RAINFALL: DECEMBER TO FEBRUARY.



After Supan

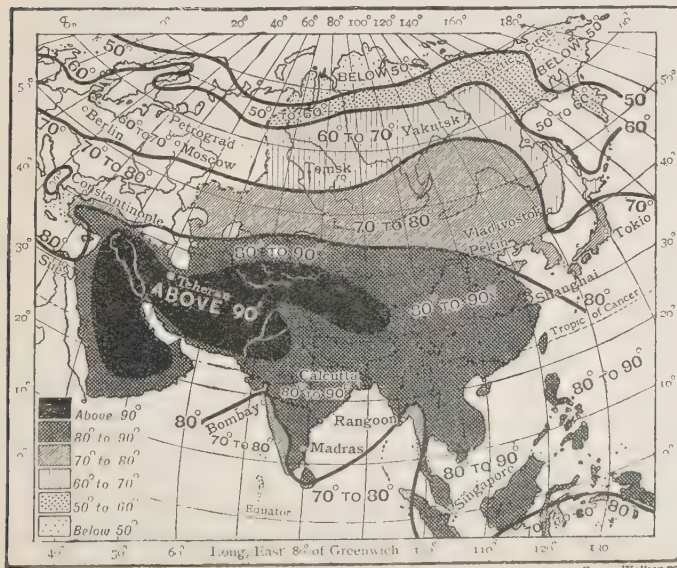
Emery Walker sc

FIG. 179.—ASIA: JANUARY ISOTHERMS.



Emery Walker sc.

FIG. 180.—ASIA: JULY ISOTHERMS.



Emery Walker sc.

From east to west irrigation is still practised. In the hilly regions of Japan and China and on the mountains of India **terraced cultivation** is carried on, the tiny hill-streams being conducted along channels, often for very long distances. Most of the rivers of India, and particularly the Indus, provide water for what is perhaps the greatest system of **canals** in the world. The rivers of Turkestan are also utilised in the same way. In Persia and Baluchistan an ingenious method of irrigation is employed. The water is conducted along underground tunnels, called **karezes**, into which openings are made at intervals for the removal of the water. **Wells** and **tanks** are used in most parts of the continent,

VEGETATION.—The areas of characteristic vegetation follow the climatic regions very closely.

1. The northern region divides into two as regards vegetation, viz. the **toundras** of the Arctic coast and the **forest** area further south. The mean temperature of the toundras in the depth of winter is equal to 60° of frost, and the ground is frozen hard; but in summer the mean temperature is between 50° and 60° F. (compare with the winter temperature of North India), and then the ice thaws and the rivers overflow, turning the surface soil into a swamp. In such conditions only those plants thrive as can survive hard winter frosts and require little depth of earth, such as **mosses**, **lichens**, **stunted bushes**, and certain **flowering plants**.

The **forest belt** stretches right across the continent to the south of the toundras, and has cone-bearing trees in its northern portion and deciduous trees further south. These forests have not yet become commercially important owing to the absence of ready means of transport, the rivers of the forest area draining northwards into the Arctic Ocean. Towards the edge of the plateau, where the climate is milder and the land fertile, **grains**, like wheat, are possible and are being increasingly grown.

2. The **desert** areas of Asia have been divided into two classes—the elevated deserts of the interior and the tropical deserts of the south. The former consist of dreary wastes covered with snow in winter, and having very sparse vegetation on which the yak, the chief animal, finds a precarious existence. Along the river valleys, where flourishing oases exist, grains and fruits are cultivated. These deserts merge into **steppe** lands—rolling plains of pasture during the summer and barren wastes in the winter.

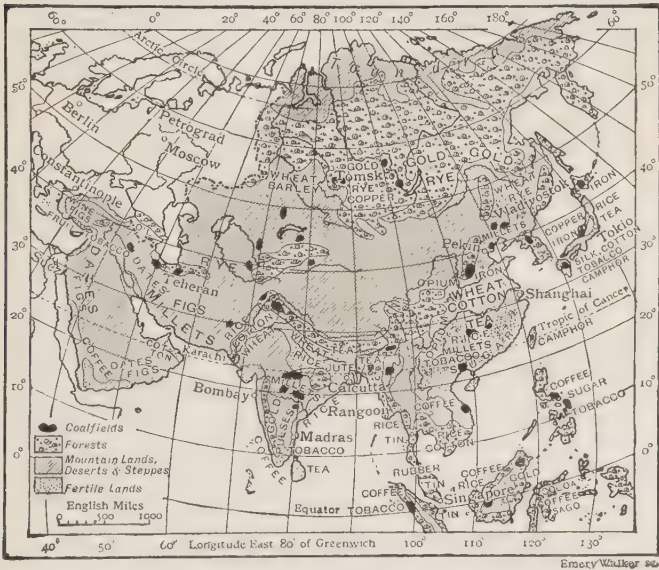
The tropical deserts of the south-west are mostly sandy, and produce **prickly shrubs** on which camels feed. Wherever water is found oases spring up, and the **date palm** and **gum-yielding plants** flourish. In Yemen, in the south-west of Arabia, **coffee** of the finest quality is produced and where irrigation is possible—*e.g.* Quetta—**fruit** and **grains** are grown.

3. The vegetation of the lands bordering the Mediterranean Sea is characteristic, and the Mediterranean types of vegetation are found in Asia, from Asia Minor to Persia. **Fruits** are important. The **vine** is grown and wine manufactured, and **grapes**, **figs**, **olives**, **oranges**, and other varieties are exported, either fresh or dried. The oranges of Jaffa, the figs of Smyrna, and the wine of Shiraz are noted. The chief cereals are **wheat**, **barley** and **millets**, and **cotton** and **tobacco** are cultivated. The **mulberry** tree supports the silkworm, and the highlands of the interior are clothed with **pines**, **cedars**, and other trees.

4. The most luxuriant and varied vegetation in Asia is found in the monsoon region. The products vary very much according to altitude and latitude, and according to location inland or near the sea. Of cultivated crops the most important is **rice**, which is grown in flooded fields in all the

coast lands from India to Japan. It is not only one of the staple foods of the people of the East, but a large surplus is available for export. Other cereals are **maize** and **millets**, which are widely distributed, and **wheat** and **barley** are extensively grown in China, Japan, and the North of India. The monsoon lands are the greatest **tea** producers in the world, where the well-watered slopes of the Himalayas, the Western Ghats, Ceylon, China and Japan are well drained, and the soil is suitable for its growth. **Oilseeds**, **jute**, **tobacco**, **indigo**, the **opium poppy** and **sugar** are grown very largely in India, giving rise to important industries. **Coffee** thrives in South India and in the Malay Archipelago, the East Indies being also the world's chief source of **spices** and **sago**. The forests of the monsoon area are very dense and provide valuable timbers. On the Himalayas are **deodars** and other cone-bearing trees, and Burma and the Deccan produce **teak**, and fancy

FIG. 181.—ASIA: VEGETABLE AND MINERAL PRODUCTS.



woods such as **ebony** and **sandalwood**. The **rubber tree** is being successfully grown in Ceylon, Assam, and Burma, and Ceylon also produces **cinchona** and the **coconut palm**. The East Indian Islands have forests of great economic value, and the **mulberry tree** supports the silk industry of India, China, and Japan.

ANIMALS.—As Asia extends from the Equator to the Arctic Circle, it exhibits a great variety of animal life.

In the Northern Region the forests furnish shelter for numerous wild animals, which are protected from the cold by thick furs, for the sake of which they are hunted. Some of the principal of these are the **bear**, the **Arctic fox**, the **squirrel**, **sable** and **marten**. The only beast of burden in the far north is the **reindeer**, which is also the chief source of wealth of the

inhabitants of the toundras, providing milk and flesh for food, as well as skins for clothing.

In the Central Highlands are to be found many varieties of domestic animals. **Sheep** and **goats** furnish wool and hair for the making of fabrics and carpets, while **cattle** provide milk and butter and are used for ploughing and for other draught purposes. Of transport animals, the **yak** is used in Tibet and on the plateaux, the **camel** or **dromedary** in the deserts, and the **horse** on the steppes. This area is also the home of the wild **ass**.

South-western Asia is famous for its fine breed of **horses**, of which the finest are found in Central Arabia and in Mesopotamia. In the hot deserts the **camel** is employed as an animal of transport, and the **ostrich** is found in Arabia.

The animal life of the monsoon area is almost as varied as its vegetation. The thick forests and jungles are the home of many wild animals, such as the **elephant**, **rhinoceros**, **tiger**, **panther**, **jackal**, and **monkey**, also of gorgeously plumaged **birds**, lovely **insects**, and dangerous **reptiles**, while the **crocodile** lives in the rivers. The elephant is used as a beast of burden, chiefly in Burma and Siam, and the **ox** and **buffalo** are employed for draught purposes and ploughing all over this region.

RIVERS.—The drainage of Asia corresponds with the climatic zones.

1. The **rivers of the Monsoon Region** mostly rise in the mountain ranges bordering the south and east of the plateau of Tibet, and, being fed with abundant supplies of water, are of great importance, both for navigation and irrigation.

The **Hwang-ho** (2,600) and the **Yang-tse-kiang** (3,000) flow into the Yellow Sea; the **Si-kiang** (1,100), **Song-ka**, **Me-kong**, and **Me-nam** into the China Sea; the **Salwin**, **Irawadi**, **Brahmaputra** (1,800), **Ganges** (1,500), **Mahanadi**, **Godavari**, and **Kistna** into the Bay of Bengal; and the **Narbada**, **Tapti**, and **Indus** (1,700) into the Indian Ocean.

2. The **rivers of the Siberian Plain** mostly rise in the mountains bordering the north of the Mongolian Plateau. They are of great magnitude, but being frozen for the greater part of the year, and, with the exception of the **Amur**, emptying themselves into the Arctic Ocean, they are not of much service for navigation.

The **Ob** (2,600), **Yenisei** (2,900), and **Lena** (2,500) flow into the Arctic Ocean; the **Amur** (2,300) into the Sea of Okhotsk.

3. **Inland Rivers.**—The drainage of a very large portion of Asia, probably more than one-fourth, is not connected with any of the oceans; the streams find their way either into inland lakes or are dried up in their passage through the deserts.

The **Ural** and the **Kur** flow into the Caspian Sea, the **Amu** (1,300) and the **Sir** (1,150) into the Sea of Aral, the **Ili** into Lake Balkhash, the **Tarim** into Lob Nur, the **Helmand** into Lake Hamun, and the **Jordan** into the Dead Sea. Numerous smaller streams, after fertilising the districts through which they flow, lose themselves in the deserts.

4. The only other rivers of importance are the **Euphrates** (1,700) and the **Tigris** (1,100), which unite and flow into the Persian Gulf; and the **Kizil Irmak**, which flows into the Black Sea.

LAKES.—Asia has but few important fresh-water lakes. The chief are: **Lake Baikal** (14,000 sq. miles), drained by the Yenisei, probably the deepest lake in the world; and **Gokcha**, on the Armenian Plateau.

The **salt-water lakes** are very numerous and some are of great size. The **Caspian Sea** (170,000 sq. miles), the largest lake in the world, the **Sea of Aral** (26,000 sq. miles), and **Lake Balkhash**, are in the south-west of Asiatic Russia; **Lob Nur**, **Koko Nur**, **Tengri Nur**, on the Central Plateau; **Van** and **Urumia**, on the Armenian Plateau; and the **Dead Sea**, in Palestine.

MINERALS.—The principal districts in which the mineral wealth is most abundant are the Ural and Altai Mountains, India, Indo-China, China, and Japan. The distribution of the more important minerals will be seen from the following table:—

Coal.—China, India, Japan, Borneo, Caucasia, Persia.

Petroleum.—Caucasia, Burma.

Iron.—India, China, Japan.

Gold.—Siberia, India, Burma, Borneo, China, Japan.

Silver.—Siberia, Japan, China, Western Asia.

Copper.—Siberia, Caucasia, India, China, Japan, Western Asia.

Lead.—Siberia, India, China, Japan.

Tin.—Malay Peninsula, Banka and Billiton in the Eastern Archipelago.

Platinum.—Ural Mountains.

Graphite.—Ceylon, Siberia.

Salt.—India, Asia Minor, Siberia, Arabia, China.

Diamonds.—India, Borneo, Siberia.

Rubies.—Burma.

Sapphires.—India, Ceylon.

PEOPLE.—Asia is chiefly inhabited by two stocks, the **Mongolian**, or **Yellow**, and the **Caucasian**, or **White**. The great mountain-chain stretching from the Himálayas to the Caspian Sea forms a broad line of division. North and east of this line the type is Mongolian, of which the **Chinese** are the most important group. South and west of this line the type is principally Caucasian, the **Hindus** being the most numerous branch.

The total population of Asia is estimated at about 830,000,000, giving an average density of 57 to the sq. mile. This vast portion of the human race is very unequally distributed. The south-eastern part is, on the whole, densely peopled; India, China, Japan, and the island of Java have the greatest average density, and are said to contain about seven-eighths of the whole population of the Continent. The central table-lands and the northern plain are very sparsely peopled, a considerable portion having an average density of less than 10 per sq. mile.

FIG. 182.—DENSITY OF POPULATION.



THE COUNTRIES IN ASIA WITH THEIR CAPITALS

Country	Capital
Siberia	Russia in Asia { Omsk and Irkutsk Tashkent Tiflis
Russian Central Asia	
Caucasia and Armenia	
Asia Minor	
Syria (French Protection)	
Palestine (British Protection)	Damascus
Mesopotamia (British Protection)	Jerusalem
Arabia	Bagdad
Persia	Teheran
Afghanistan	Kabul
Baluchistan	Kelat
India	Delhi
Burma	Indo-China { Rangoon Bangkok Singapore Saigon
Siam	
Malay Peninsula	
French Cochin China, Tongking, Annam)	
Malay Archipelago	
China	Batavia
Chusen	Peking
Tibet	Seul
Japan	Lhassa
	Tokio

EXAMINATION PAPERS

- A. 1. What is meant by the term Eurasia? Give its width from north to south.
 2. In what respect does the "relief" of Asia differ from that of Europe?
 Mention the principal plateaux, with their approximate elevation.
 3. Mention the chief arid regions of Asia. Why are they so?
 4. Show how the great mountain ranges of Asia radiate from the elevated region of the Pamir.
- B. 1. A continuous line of elevation extends from the Archipelago to Behring Strait. Name the consecutive ranges which form this line.
 2. Describe the mountains which border the Plateau of Tibet.
 3. Give the plains of the Monsoon Region. How do you account for their fertility?
 4. Describe the outline of Eastern Asia.
- C. 1. What are the causes of the severe climate in the north of Asia?
 2. Why is that part of Asia lying between 40° and 50° N. Lat. so much colder in winter than that part of Europe that lies in the same latitude?
 3. How do the Himalayas affect the climate of India and Tibet in summer and winter?
 4. If the isobar of 32° be followed it will be seen that in North-West Europe it reaches the Arctic Circle, whereas in Asia it falls below 40° N. Lat. Explain this great range.
- D. 1. How do the Himalayas affect the climate of (1) India, (2) Tibet?
 2. Why is the climate of Eastern Asia more extreme than that of Western Europe?
 3. Name the principal rivers of (1) the Northern Plain, (2) of the Monsoon Region.
 4. Give the chief salt-lakes of Asia, and mention the principal rivers flowing into them.
- E. 1. Explain why the zones of vegetation correspond with the climatic zones.
 2. Describe the vegetation, animals, and people of South-eastern Asia.
 3. What is the line of separation between the two great types of people in Asia? Give the races belonging to each type.
 4. Give the situation of the river Amur, Yakutsk, Lake Balkhash, Cherra Poonjee, river Helmand, Tengri Nur, Lake Van, Riu-kiu Islands, Cape Lopatka, Bas-el-Had, and La Pérouse Strait.

ASIATIC RUSSIA

EXTENT AND POPULATION.—The whole of Northern Asia from the borders of the Chinese Empire to the Arctic Ocean, and from the Ural Mountains to the Pacific, belongs to Russia. This vast dominion, which includes more than one-third of Asia, has an **area** of about 6,000,000 sq. miles, but owing partly to the severity of its climate, and partly to its situation, the **total population** is only about 25,000,000.

It is divided into three distinct regions, the approximate area and population of each being as follows:

1. **Siberia**, 5,000,000 sq. miles; 1,100,000 inhabitants.
2. **Russian Central Asia** (including Khiva and Bokhara), 1,300,000 sq. miles; 11,000,000 inhabitants.
3. **Caucasia**, 95,000 sq. miles; 7,000,000 inhabitants.

Caucasia includes the districts on each side of the Caucasus Mountains. The districts north of the mountains is usually assigned to Europe.

I. SIBERIA

RELIEF.—Siberia consists of a vast plain in the north and west, sloping towards the Arctic Ocean, and of plateaux and ranges of mountains in the south and south-east.

The **mountains** may be grouped into two systems: 1. The **Altai** system in the south, consisting of several more or less detached ranges, pierced by river valleys. The **Altai** (11,000 ft.), **Yablonoi**, and **Stanovoi Mountains** are the most important portions of this system, which is continued along the peninsula of Kamchatka by a lofty range of igneous formation containing many active volcanoes, one of which rises to the height of 16,000 ft.

This range forms part of the volcanic chain which stretches from Alaska through the islands on the east of Asia to the Eastern Archipelago.

2. The **Urals**, separating Asiatic from European Russia.

COAST LINE.—The coast of Siberia, although extensive, is not of much service commercially, being ice-bound for the greater part of the year; **Vladivostok**, the Russian naval station on the Sea of Japan, being the only port open for more than half the year. The **Sea of Okhotsk**, although in the same latitude as the North Sea, is closed for more than half the year. The large island of **Sakhalin**, with an area of nearly 30,000 sq. miles, is used by the Russians as a convict settlement. Its chief products are coal and furs.

CLIMATE AND RAINFALL.—The climate of Siberia is extremely severe; the mean annual temperature for the greater part of the country is below 32° F. The winter lasts for nine months, and snow covers the ground for the greater part of the year. During the short summer the temperature rises considerably, there being no ocean to temper the heat, and a remarkable range of temperature is experienced. In the district around **Yakutsk** (Russian, *sk* = town) the difference between the summer and winter temperature is 100°. **Verkhoyansk**, just north of the Arctic Circle, has the reputation of being the coldest place on the globe.

The **rainfall** is deficient on the whole, the prevailing south-west winds being land winds; but as the evaporation is slight, and the rain mostly falls in summer, the inhabitants of the southern districts are enabled to raise a considerable amount of grain. East of Lake Baikal south-east winds from the Pacific cause an abundant rainfall.

RIVERS AND LAKES.—Siberia has a most extensive system of waterways, its great rivers furnishing about 30,000 miles of navigable waters; but as they are icebound for a great

part of the year, and as most of them flow into the Arctic Ocean, which is open only for ten or twelve weeks during the summer, they are of comparatively little service as means of communi-

FIG. 183. — ASIA: POLITICAL.



Walker & Boutwell.

Longitude East 80 of Greenwich

Longmans & Co. London & New York.

British Mandate

cation with other lands. In 1890 two British vessels entered the Yenisei, and returned with a cargo the same year. The four chief rivers are the **Ob**, **Yenisei**, **Lena**, and **Amur**.

1. The **Ob** (2,600) rises in the Altai Mountains, and drains the largest area of any Siberian river. Its chief tributary, the **Irtish**, rises in Mongolia, drains **Lake Zaisan**, collects the waters of the **Tobol** and **Ishim**, and joins the **Ob** after a course of 1,900 miles. The main stream now flows northward for 700 miles, and empties into the Gulf of Ob.

2. The **Yenisei** (2,900) rises in the Mongolian Plateau. Its two chief tributaries are the **Angara** or **Upper Tunguska** and the **Lower Tunguska**. The **Angara** drains **Lake Baikal** (14,000 sq. miles), the 'Holy Sea' of the Mongols, and said to be the deepest lake in the world. A canal is in course of construction between the Yenisei and the Ob. The **Lower Tunguska** approaches within fourteen miles of the **Lena**, so that there are but two short breaks (17 miles) in a water communication of 6,000 miles, extending from **Yakutsk** to the **Urals**.

3. The **Lena** (2,500) rises in the mountains lying to the north of **Lake Baikal**, and, after receiving the waters of the **Vitim** and **Aldan**, discharges itself by numerous mouths into the Arctic Ocean, forming an extensive delta.

4. The **Amur** (2,300) rises in the **Yablonoi Mountains**. It receives the waters of the **Shilka** and **Sungari**, and flows into the Sea of **Okhotsk**. This river is likely to become of more commercial importance than any of the Siberian rivers, as it flows through a fertile district and is free from ice for half the year.

PRODUCTIONS.—1. **Vegetable.**—A considerable quantity of grain is grown in the rich black soil of the south of Siberia. The summer, though short, is bright and warm enough to ripen wheat of excellent quality. North of this region extensive forests of pine, birch, larch, &c., cover vast tracts of the country, and berry-bearing plants grow in great profusion. Towards the Arctic Ocean mosses, lichens, and grasses cover the dreary tundra.

2. **Animal.**—Fur-bearing animals, such as the **sable**, **fox**, **marten**, **ermine**, **squirrel**, &c., are the most important. Among the other important animals may be mentioned bears, wolves, deer, and myriads of rodents, such as marmots and lemmings. Birds are very numerous, and the rivers and lakes swarm with fish, such as the **sturgeon**, **salmon**, &c. **Fossil ivory**, the remains of the mammoth, is obtained from the **Liakof Islands** and along the Arctic coast. The principal domestic animals are the **fat-tailed sheep** and the **camel** in the steppes, the **reindeer** in the tundra, and the **yak** in the district of the Upper Yenisei.

Mineral.—Siberia is rich in minerals. Gold is the most important mineral, and is now chiefly obtained from Eastern Siberia. Graphite, silver, iron, lead, copper, and coal, though abundant, are not much worked.

MEANS OF COMMUNICATION AND TOWNS.—1. The rivers, as has already been explained, are not available for communication except in summer. By means of the canal from the Yenisei to the Ob continuous water communication from **Lake Baikal** to **Tyumen** will be possible.

2. **The Railways.**—A railway crosses the Urals from Perm, through Ekaterinburg, the centre of the Ural mining district, to **Tyumen**, on the Tobol. From here the line has been completed to **Vladivostok**, on the Sea of Japan, a distance of about 5,000 miles. The importance of Russian railways (European and Asiatic) is seen from the fact that they employ over 800,000 men.

3. **The Great Postal Road.**—This is another principal means of communication in Siberia. Beginning at **Tyumen** (34), it passes through **Omsk** (129), the capital of Western Siberia, **Tomsk** (112), the seat of the Siberian University, **Krasnoyarsk**, on the Yenisei, **Irkutsk** (108), the capital of Eastern Siberia, round the south of Lake Baikal to **Kiakhta**, on the Chinese frontier, where the teas and silks of China are exchanged for the furs and other products of Siberia. From **Kiakhta** the road passes along the Shilka Valley, through **Nerchinsk**, the centre of a silver-mining district, and down the valley of the Amur to its junction with the Ussuri; from here it turns south up the Ussuri Valley, and finally terminates at **Vladivostok**. From **Omsk** a branch passes along the Irtysh Valley, through **Semipalatinsk**, the centre of an important agricultural district, and **Barnaul**, the chief town of the Altia district, rejoining the main road at **Tomsk**.

The only other towns of importance not on the main road are **Tobolsk** (20) on the Tobol, **Yeniseisk** on the Yenisei, **Yakutsk** on the Lena, a centre of the fur trade, **Nikolaievsk** at the mouth of the Amur, and **Petropaulovski** at the south of Kamchatka.

PEOPLE AND RELIGION.—Of the population of Siberia about 4,700,000 are of Slav stock, many of whom are political offenders sent from Russia, and Russian peasants who have emigrated to the agricultural land of the south. The bulk of the people live in the southern part of the Ob basin and in the neighbourhood of the great roads and rivers. The native population numbers about 750,000, and appears to be gradually decreasing. Besides the Slavs there are over 13 millions of Turko-Tatars, and also several millions of Finns, Mongols, Caucasians. There are also small numbers of native races inhabiting the far northern region.

II. RUSSIAN CENTRAL ASIA

POSITION.—This vast district, frequently known as **Russian Turkestan**, extends from the Caspian Sea eastwards to the borders of the Chinese Empire, and from Persia and Afghanistan northwards to the neighbourhood of **Omsk**, in Siberia.

RELIEF.—The eastern part consists of an elevated plateau, rising to the **Great Pamir** and the **Tian-shan Mountains**, the chief summits of which attain an altitude of 25,000 ft. The valleys of this district are well watered and exceedingly fertile, and are becoming largely settled by Russian emigrants. The higher lands of the Pamirs afford excellent pasturage for the nomadic Kirghiz who visit them in the summer. From this elevated region the land slopes westwards towards the most extensive area of depression in the world, a considerable portion lying below the sea-level.

The lowest part of this depression is occupied by the Caspian Sea, the surface of which is 84 ft. below the level of the Black Sea. The greater part of this

lowland region consists of steppes, the dried-up bed of a vast inland sea, which communicated with the Black Sea by the Manich depression, and with the Arctic Ocean by the Ob basin. The **Caspian Sea**, the **Sea of Aral**, and probably **Lake Balkhash**, may be regarded as the remains of this inland sea, which is supposed to have been connected with the Han-hai through a depression in the mountains. The lowlands around the Sea of Aral are known as **Kara Kum** (Black Sands) and **Kizil Kum** (Red Sands).

CLIMATE, PRODUCTIONS, AND PEOPLE.—The climate of this district is remarkably uniform throughout. Great heat in summer is followed by intense cold in winter, the temperature falling to 30° below freezing-point

FIG. 184.—RUSSIAN CENTRAL ASIA.



Longmans & Co. London & New York.

Walker & Cockerell sc.

on the lowland steppes as well as on the uplands of the east. **Extreme dryness** is characteristic of the whole region; and but for the melting of the snow and the rainfall on the eastern mountains, which supply the rivers, the district would be uninhabitable. It is upon this supply of water that the irrigation works of Samarkand, Bokhara, Khiva, Merv, &c., depend. Where the land is irrigated, **fruit and cereals** of excellent quality are produced in great abundance. **Cotton** is the most important commercial product, and is the chief article of export. The nomadic tribes rear **horses, cattle, sheep, and camels**.

The people are chiefly of **Turki race** (hence the name **Turkestan**, land of the Turks), intermingled in the south with a considerable number of **Iranians** known as **Tajiks**. The **Usbeks** of Bokhara and Khiva, the **Kirghiz**

who inhabit the steppes from Lake Balkhash to the Volga, and the **Turkomans** of the south are the principal native races, most of whom follow the **Muhammadan religion**.

RIVERS AND TOWNS.—All the rivers, with the exception of the tributaries of the Ob, drain inland into the lakes or are dried up in the desert. The principal rivers are:—

1. The **Amu** (1,300), which rises in Lake Sir-i-Kul at an elevation of 13,900 ft., and, after supplying the vassal States of **Bokhara** and **Khiva** with water for irrigation, flows into the southern end of the Sea of Aral. **Khiva**, the capital of the Khanate, is a small and unimportant town.

2. The **Sir** (1,150), which rises in the Tian-shan, and flows into the northern end of the Sea of Aral. The principal towns on it are **Khokand** (81), an important trading centre, and **Tashkent** (155), the seat of the Russian administration.

3. The **Zerafshan**, formerly a tributary of the Amu, is entirely used up for irrigation. The chief towns on it are **Samarkand** (58), the ancient capital of the great conqueror, **Timur**, and **Bokhara** (100), the capital of the Khanate, and formerly a place of great importance. **Bokhara** is rapidly decreasing owing to the failure of the water supply, which is drawn off above at **Samarkand**.

4. The **Murghab** supplies the oasis of **Merv**, and, like the **Zerafshan**, dries up in the desert.

5. The **Ili** flows through a fertile district into Lake Balkhash.

The most important means of communication and the great civilising agent of this district is the **Trans-Caspian railway** from **Krasnovodsk** on the Caspian through **Merv** and **Bokhara** to **Samarkand**, **Tashkent** and **Khokand**.

III. CAUCASIA AND ARMENIA

POSITION.—Caucasia consists of the neck of land lying between the Black and Caspian Seas. It extends northwards to the depression of the Manich Valley, which indicates the position of the strait which formerly united the two seas; while on the south it borders on Turkey and Persia.

RELIEF.—The surface of Caucasia naturally divides itself into four parts:—

1. The **Steppes**, extending from the Manich Depression to the foot of the mountains, and chiefly inhabited by nomadic tribes.

2. The **Caucasus Mountains**, which proceed for 700 miles from **Cape Apsheron**, on the Caspian, to the mouth of the **Kuban River**, dividing the district into two portions, known as **Cis-Caucasia** and **Trans-Caucasia**.

The range shows many evidences of volcanic action, extinct cones, mud-volcanoes, hot springs, and naphtha wells occurring throughout its length. **Mount Elburz** (18,500 ft.) is the highest peak. Near **Mount Kazbek** (16,500 ft.) the **Gorge of Dariel**, traversed by the great military and trade road, cuts the range into two sections.

3. The **Valleys of the Rion and Kur**. Here the mountains shut off the north winds, and the vegetation is varied and almost tropical in its luxuriance.

4. **The Armenian Plateau.** Only a portion of this region belongs to Russia; the larger part lies within the Turkish and Persian borders. The highest peak, **Mount Ararat** (17,000 ft.), is situated at the junction of the Russian, Turkish, and Persian Empires.

On this plateau are three extensive lakes—**Gokcha**, a fresh-water lake drained by the **Aras**, **Van** in Turkey, and **Urumia** in Persia, both of which are salt and have no outlet.

CLIMATE AND PRODUCTIONS.—North of the mountains the climate is much colder and drier than to the south, while the district facing the Black Sea receives much more moisture than that facing the Caspian.

Wherever there is plenty of water good crops of cereals (rice, wheat, maize, millet, &c.) are raised in the lowlands. Stone fruits (peach, apricot, cherry, &c.) are found in great variety and abundance. In Trans-Caucasia the vine, orange, citron, and mulberry grow in great perfection. The most important commercial products of this region, however, are the minerals, of which petroleum is the chief. This abounds at each end of the mountain range. At **Baku**, the chief centre of production, a large fleet of vessels are engaged in the trade, while enormous quantities are carried by rail to **Batum** for shipment to other countries. **Manganese**, copper, iron, coal, and salt are also found in abundance.

RIVERS.—In Cis-Caucasia the chief rivers are the **Kuban**, flowing into the Sea of Azof and the Black Sea, and the **Terek**, which brings vast quantities of mud to the Caspian. In Trans-Caucasia the **Rion** flows through a fertile valley to the Black Sea. The most important rivers of Caucasasia are the **Kur** and **Aras**, which unite and flow into the Caspian by one mouth. The Kur is navigable for about 450 miles, and teems with sturgeon and other valuable fish. The Aras is almost wholly within Armenia, and for a considerable distance forms the boundary line between Russia and Persia.

MEANS OF COMMUNICATION AND TOWNS.—All the main roads from Southern Russia meet at the fortress of **Vladikavkaz** (76), on the Terek, the terminus of the railway from Rostov. From here the great road leads through the Darial Gorge to **Tiflis** (303) on the Kur, the capital of Trans-Caucasia. It here meets the **Trans-Caucasian** railway from **Baku** (250) to **Batum** (40) and **Poti**. From Batum a military road leads to the strong fortress of **Kars**, and on to **Erivan**, the capital of Russian Armenia. The only other important towns are **Ekaterinodar** (99), on the Kuban, the centre of an agricultural district; **Stavropol** (60), on the edge of the northern steppe; **Derbent**, which commands the coast road from Baku; and the fortress of **Alexandropol** (49), which commands the Aras basin.

PEOPLE AND RELIGION.—Caucasia is inhabited by a number of tribes, of whom the **Georgians** are the most important. Since the conquest of the country by the Russians many of the warlike **Circassians** emigrated to Turkish territory. The northern steppes are chiefly inhabited by Russians and various **Tartar** tribes. In the south the **Armenians** are the most important nationality. Most of the inhabitants are followers of the **Greek Church**, **Muhammadanism**, and **Armenian Christianity**.

EXAMINATION PAPERS.

- A. 1. What are the chief divisions of Asiatic Russia? Give their approximate area and population.
 2. Trace the mountain system of Asiatic Russia from the Pamirs to Behring Strait.
 3. Why is the climate of Siberia cold and dry?
 4. Explain how the products of China would reach Tyumen by water.
- B. 1. Explain why the Siberian rivers are commercially unimportant.
 2. Describe a journey from Perm to Vladivostok by the great postal road.
 3. Where are the following places, and state what they are noted for: — Liakov Islands, Cape Chelyuskin, Yeniseisk, river Aldan, Sakhalin, Verkhoyansk, and Barnaul?
 4. What are the chief products of Siberia?
- C. 1. Describe the steppes of Turkestan.
 2. What parts of Turkestan are the most productive, and what circumstances affect this productiveness?
 3. What are the chief features of the 'relief' of Caucasia?
 4. How would a traveller from Rostov reach Kars? Mention the most important places he would pass through.
- D. 1. What districts are noted for the following products:—Petroleum, stone-fruits, cotton, wheat, sable, silver, horses, gold, reindeer, and wine?
 2. Why are the following places important: Vladivostok, Gorge of Dariel, Samarkand, Tyumen, Irkutsk, Tiflis, Batum, and Kars?
 3. What other Empires do the Russian boundaries touch in Asia and what physical features tend to keep back further expansion?
 4. What are the chief railways in Asiatic Russia? Show how they have developed the trade of the districts through which they pass.

ASIATIC TURKEY

POSITION, AREA, POPULATION.—By the Peace Treaty of 1920 Asiatic Turkey was much reduced in area.

Smyrna, with the surrounding country, was given to Greek administration.

Mesopotamia (British mandate), **Syria** (French mandate), **Palestine** (British mandate), **Armenia** and **Hejaz** (Arabia) have all become independent of Turkish rule.

Kurdistan has self-government.

The total Turkish area will be about 170,000 sq. miles, with a population of about 8 millions.

RELIEF.—The surface of Asia Minor is for the most part elevated. Mesopotamia is a lowland river valley. The highland portion is composed of the three plateaux of Armenia,

Asia Minor, and Syria, which are the westward extensions of the great central plateau region of Asia.

The **Armenian Plateau** is only partly within the Turkish dominions. Its surface is crossed by several mountain ranges, enclosing, in some cases, basins of inland drainage. The highest point is Mount Ararat, 17,000 ft. high. Westward of this district, and forming a continuation of it, is the extensive **Plateau of Asia Minor**, having an elevation of between 3,000 and 4,000

FIG. 185.—ASIATIC TURKEY.



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ft., and bordered by mountain ranges on the north and south. Towards the west valleys of great fertility open towards the Aegean Sea. The **Taurus Mountains**, which skirt the plateau on the south, are a continuation of the mountains of Armenia, and rise to a height of 13,000 ft. Between Asia Minor and Syria a gap occurs in the range, forming the famous **Cilician Gates**, through which in all ages armies and traders have passed.

Between the Euphrates and the Mediterranean lies the **Syrian Plateau**. The eastern portion consists of a sandy desert, stretching southwards into Arabia. Near the west coast the parallel chains of **Lebanon** and **Anti-Lebanon**, 10,000 ft. high, extend

southwards from the Taurus Mountains, and are continued through Palestine by ranges of lower elevation to the mountains of Sinai and Arabia. Between the two ranges lies a trough, the northern part of which is the elevated and fertile valley of **El Bekaa** (Cœle-Syria), while the southern part forms the remarkable valley of **El Ghor**, the deepest depression in the world. Through this valley the Jordan flows to the Dead Sea, the surface of which is nearly 1,300 ft. below that of the Mediterranean.

The **Plain of Mesopotamia** occupies the middle and lower portions of the basin of the Euphrates and Tigris. This is a region of wonderful productiveness wherever irrigation is carried on. Formerly it was highly cultivated and supported a dense population; now agriculture is but little practised, the scanty population depending chiefly upon the produce of their flocks and herds.

COAST-LINE.—The western coast of Asia Minor is much broken up and studded with numerous islands. The Black Sea coast and the coast of Syria are comparatively unbroken, and possess few good harbours. The principal cape is **Cape Baba**, the most westerly point of the continent. The principal parts of the sea are the **Bosporus**, the **Sea of Marmora**, the **Hellespont**, and the **Gulfs of Adalia and Iskenderun**.

Note.—The Bosporus, the Dardanelles, and the adjoining coast line, have been placed under the League of Nations.

ISLANDS.—The islands scattered along the west coast of Asia Minor are collectively known as the **Sporades**. **Imbros**, **Tenedos**, and **Castellorizzo** belong to Turkey.

Samos is now part of Greece.

Cyprus is a large island, with an area of 3,500 sq. miles and a population of 310,000, lying to the south of Asia Minor. It now forms part of the British Empire. Its chief products are wine, corn, cotton, carob beans, fruits and sponges. The capital is **Nicosia**; the two chief ports are **Larnaca** and **Limasol**.

CLIMATE.—On the plateaux of Asia Minor and Armenia the winters are very severe, while the summers are oppressively hot. The rainfall is deficient, a large part of Asia Minor being occupied by a salt desert. East of the Lebanon ranges but little rain falls, and in summer the hot winds from the southern deserts make the district arid and bare. In Mesopotamia this hot wind is known as the **Samiel**, or 'poison wind.' The valleys of the west of Asia Minor have a delightful climate. The most abundant rainfall occurs on the Black Sea coast in the neighbourhood of **Trebizond**.

RIVERS AND LAKES.—Asiatic Turkey has no large rivers. They drain into the Mediterranean and Black Seas, and are mostly mountain torrents of but little use for navigation. A considerable portion of Asia Minor, Armenia, and Syria has an inland drainage.

The principal rivers flowing into the **Black Sea** are the **Kizil Irmak** (800) and the **Sakaria**.

Of those flowing into the **Mediterranean** the most important are the **Gediz Chai**, flowing into the Gulf of Smyrna; the **Menderes** (Meander), which, on account of its windings, has furnished us with the word 'meander'; the **Jihun**, flowing into the Gulf of Iskenderun; the **Orontes** and **Leontes**, which rise near each other in Coele-Syria, and flow in opposite directions to the Mediterranean.

The greatest rivers of old Asiatic Turkey are the **Euphrates** (1,700) and the **Tigris** (1,100). Both streams rise in the Armenian highlands, and, after flowing in a south-easterly direction through Mesopotamia, unite about 120 miles from the coast and form the **Shat-el-Arab**, which finds its way through a swampy delta into the Persian Gulf. It is to these rivers that Mesopotamia owes its fertility. The melting of the snows on the Armenian mountains causes inundations which fertilise the soil and supply water for the crops. The rivers are also used for irrigation, the neglect of which has contributed largely to the decay of this once prosperous district.

INLAND DRAINAGE. The water supply of part of the interior of Asia Minor drains into lakes, of which the salt lake **Tuz Gol** is the most extensive. In Armenia, the beautiful **Lake Van** receives the drainage of a lovely valley. In Syria, the **Abana** rises in Lebanon and supplies the fruitful oasis of Damascus with water. The most interesting of the rivers draining inland is the **Jordan**, which rises near Mount Hermon, and first enters the swampy **Lake Merom**. On leaving this lake it enters the depression of **El Ghor**, passes through the **Sea of Galilee**, and flows into the **Dead Sea** at a depth of nearly 1,300 ft. below the level of the Mediterranean. The Dead Sea is about 50 miles long, and occupies the lowest part of the depression. Its waters are too salt for fish to live in, and are so buoyant that a bather cannot sink in them. Its shores abound in sulphur, nitre, and rock salt; while bitumen rises from its bottom and floats on the surface; hence its old name of Lake Asphaltites.

PRODUCTS.—On the plateau the vegetation is scanty. The slopes of the Taurus are covered in many parts with extensive pine forests, from which **turpentine** is extracted. On the shores of the Black Sea dense forests of timber trees clothe the mountain sides, while **stone-fruit trees** of great variety grow in abundance. The **buffalo** is the principal animal employed in agricultural operations, while the **camel** is the chief beast of burden. **Sheep** are the chief wealth of the nomads and inhabitants of the highland regions. The long-haired goats of the Angora district furnish the **mohair** of commerce. The chief commercial products are **wine, olives, figs, raisins** and other fruits, **wheat, barley, silk, cotton, opium, mastic, and valonia** (acorn-cups used for dyeing and

tanning). The Lebanon district and Brussa are noted for **silk**. Jaffa is noted for its **oranges**, Latakieh for **tobacco**, and Basra for its **dates**.

MEANS OF COMMUNICATION AND TOWNS.—1. **Asia Minor and Armenia.**—**Smyrna** (375), now part of Greece, is situated on a fine harbour at the head of the Gulf, and is the chief port and the most important town. From here **three short railways** proceed to the most productive valleys of this district. From **Scutari** (30), a suburb of Constantinople, a railway runs through **Ismid** to **Angora** (30). **Brussa** (110), the capital of the Turkish Empire before Constantinople was captured and the centre of a silk-producing district, is connected by a railway with the coast. From **Adana** (45) a short railway runs to **Mersina**, bringing the wheat, cotton, and sesame of this productive valley to the sea. **Konie** (25), the ancient Iconium, at the southern edge of the salt steppe, is a meeting-place for the caravans crossing the plateau. **Kaiserieh** (Cæsarea) (54) and **Sivas** (43), on the Kizil Irmak, are important centres of communication. **Trebizond** (35) is the most important port on the northern coast, and carries on a considerable trade with Persia by way of **Erzerum** (33), the capital of Turkish Armenia. **Diarbekir** (34), on the Tigris, is an important centre of river and caravan trade.

2. **Syria (French Mandate).**—**Beirut**, the chief port, is a place of considerable trade. From here a railroad runs across the mountains to **Damascus** (170), one of the oldest towns in the world and still the chief trading centre of this district. On the coast north of Beirut are the ports of **Tripoli** (30), **Latakieh**, and **Iskenderun** (Alexandretta), the port of the important town of **Aleppo** (140). South of Beirut are the ports of **Acre** and **Jaffa**. The latter is the port of **Jerusalem** (62), with which it is now connected by a railway.

3. **Mesopotamia (British Mandate).**—Camel caravans and boats on the Euphrates and Tigris are the chief means of communication, although the projected Euphrates Valley Railway, bringing this district into connection with Smyrna, has long been talked of. Ocean-going vessels ascend the river to **Basra**, formerly of considerable importance. Steamers now ascend the Tigris to **Bagdad** (250), the ancient capital of the Empire of the Caliphs. Higher up the river stands **Mosul** (80), once noted for its cotton fabrics, named **muslins** from this town.

ARABIA

POSITION AND AREA.—Arabia is separated from Africa by the long narrow **Red Sea**, which for 1,800 miles forms its western boundary. On the south its shores are washed by the **Arabian Sea**. On the east the **Persian Gulf**, which once extended much further inland, separates it from the Iranian Plateau. On the north the boundary is merely an arbitrary line running across the Syrian desert. It is the largest peninsula in the world, its area being about 1,000,000 sq. miles.

As far as its climate and physical features are concerned, it is really a continuation of the Sahara, the Red Sea being too narrow to cause any important difference in the climate.

RELIEF.—The peninsula forms one extensive plateau, having an elevation of over 3,000 ft., with a narrow strip of lowland near the coast. The southern part of the plateau consists of an arid sandy plain, of which but little is known; the northern part is gravelly or stony; the central district of **Nejd** is broken up by hilly districts, the valleys of which are watered by short streams, and are the homes of a settled population. Towards the Red Sea the coast range forming the edge of the plateau rises to a height of 8,500 ft. In **Yemen** the mountains arrest the rains, and fertile valleys justify the ancient name of Arabia Felix. In the peninsula of **Sinai** the mountains reach an elevation of over 9,000 ft.

The lowland district of **El-Haza**, and the narrow strip called the **Tehama**, stretching from Jedda to Mocha, are exceedingly hot and unhealthy.

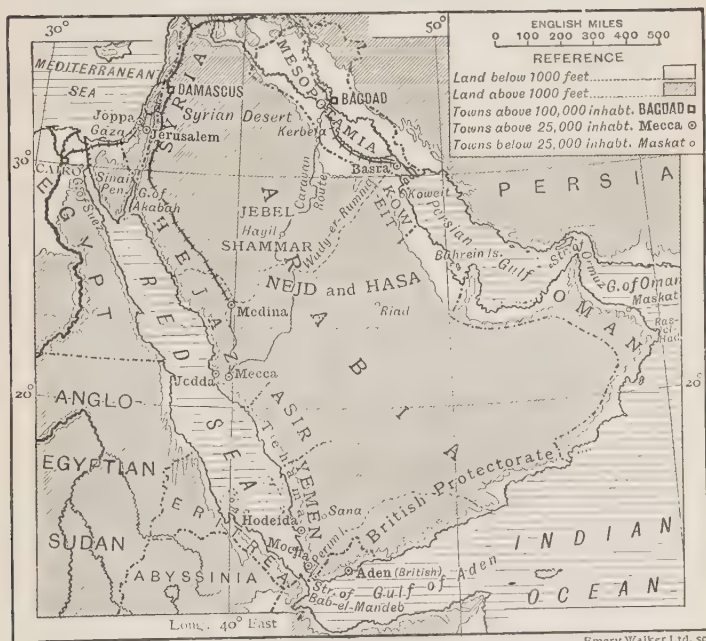
COAST LINE. There are no large inlets and but few harbours. Extensive coral reefs and numerous rocks render the navigation of the Red Sea dangerous. The **Gulfs of Suez** and **Akabah**, at the north of the Red Sea, wash the shores of the rocky peninsula of **Sinai**. In the **Strait of Bab-el-Mandeb** the fortified island of **Perim**, belonging to England, commands the passage. **Ras-el-Had** is the most easterly cape. From the **Gulf of Oman**, the **Strait of Ormuz** leads to the Persian Gulf, on the western shores of which lie the **Bahrein Islands**, the centre of an important pearl fishery, and under British protection.

CLIMATE.—Intense heat and dryness are the characteristic features of the climate of Arabia. The winds, being chiefly land winds from the Sahara, bring no moisture. The greater part of the peninsula is what may be termed a **rainless district**, rain falling sometimes only at intervals of three or four years. Even in the mountainous districts of **Yemen** and **Oman** the rainfall is very scanty, and sometimes fails altogether. The shores of the Red Sea and Persian Gulf are among the hottest districts

in the world, the average annual temperature being over 80° F. The highland districts of Nejd and Yemen enjoy a dry, healthy, and bracing climate.

The water-courses, or **wadies**, of Arabia are dry for most of the year. Numerous wells occur along their courses, and hence they are the resort of the Bedouins during the summer. The most extensive of these channels is the **Wady-er-Rumma** (800 miles), which flows from the Hejaz coast range to the Euphrates, of which it may be regarded as a tributary.

FIG. 186.—ARABIA.



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PRODUCTS.—The date palm is the most important tree, supplying the chief food of the inhabitants. The Arabs are mainly a **pastoral people**, their sheep, goats, asses, camels, and horses forming their chief wealth. Agriculture is carried on in the valleys, and crops of **grain** (chiefly durra, a kind of millet), tobacco, and fruits are raised. **Yemen** produces excellent **coffee** and fruits; **Oman** yields good **cotton**; while the west and south have from ancient times been noted for **frankincense**, myrrh, gums, **balsam**, senna, &c. Among the **wild animals** may be mentioned the lion, leopard, panther, jackal, wild boar, ostrich, and gazelle.

POLITICAL DIVISIONS AND TOWNS.—1. The Kingdom of Hejaz consists of about 100,000 sq. miles, with a population estimated at about three-quarters of a million. It forms an independent kingdom. The principal towns in Hejaz are **Mecca** (60), the birthplace of Muhammad: it contains within its great mosque the sacred Kaaba. Every spring thousands of pilgrims journey here from all parts of the Muhammadan world. Here resides the Sherif of Mecca and Medina, the guardian of the holy places, a dignitary of great importance. North of Mecca lies **Medina**, the burial-place of the prophet. On the coast, about 65 miles from Mecca, is the port of **Jedda**, a place of considerable trade during the season of pilgrimage. The largest town in Yemen is **Sana** (50), a well-built town, situated in a fertile valley. The Imaum of Sana is one of the most powerful of the native emirs. **Hodeida** is the principal port of the district.

2. **Egyptian.**—The peninsula of Sinai forms part of Egypt.

3. **British.**—The fortress of **Aden** (60) and the surrounding district, together with the island of **Perim**, belong to England. Aden is an important commercial centre and possesses an excellent harbour. It is situated in the barren crater of an extinct volcano, and almost all the necessities of life have to be imported.

Native States.—The principal native States are:—1. The Emirate of **Nejd** and **Hasa**. 2. The Emirate of **Jebel Shammar**. 3. The Principate of **Asir**. 4. The Imamate of **Yemen**. 5. The Sultanate of **Oman**. 6. The Sultanate of **Koweit**.

PEOPLE AND RELIGION.—The Arabs belong almost entirely to the **Semitic** family. They may be divided into two classes: the settled population of the towns and agricultural districts and the nomad **Bedouins** of the desert. The **Bedouins** are divided into numerous tribes, each under its own **sheikh**. They change their camping grounds at more or less regular intervals, each tribe keeping within its own district. The population estimates vary greatly, there being no reliable information; probably the total population is about **five millions**, all of whom are **Muhammadans**, mostly of the **Sunni** sect.

MEANS OF COMMUNICATION.—The chief means of communication are the caravan routes, which cross the desert in various directions, following the lines of the wells and reservoirs. The routes traversed by the **Sunni** pilgrims from **Turkey** and by the **Shiah** pilgrims from **Persia** are the most important. The first-named runs from **Damascus** through **Palestine** and on to **Mecca**, the second from **Bagdad** through **Kerbela** and **Hayil** to **Medina**. Large numbers of pilgrims go by sea to **Jedda** and thence to the holy cities. Their number has greatly increased since the opening of the **Suez Canal**. The **Damascus-Mecca** railway is open as far as **Medina**.

EXAMINATION PAPERS

- A. 1. What does Asiatic Turkey consist of, and what was lost as a result of the Great War?
2. Describe the surface of Asiatic Turkey.
3. Trace the mountain system from Mount Ararat to Arabia.
4. Describe the valley which stretches through Syria from north to south.
- B. 1. Mention the chief features of importance in connection with the coast of Asia Minor.
2. Why is the rainfall of Asia Minor scanty? What is the result of this?
3. How do you account for the decline in population of Mesopotamia? How was its former large population sustained?
4. What portions of Asiatic Turkey drain inland? Describe them.

- C. 1. Where are the following products obtained from :—Mohair, tobacco, silk, dates, oranges, turpentine, raisins, bitumen, and sponges?
 2. Name the principal ports of Asiatic Turkey and mention any inland towns with which they are directly connected.
 3. Describe the route of a traveller from Scutari to the Persian Gulf.
 4. Name the principal races of people inhabiting Turkey in Asia, and give their chief characteristics.
- D. 1. Why is Arabia chiefly a rainless district?
 2. What do you know of the kingdom of Hejaz?
 3. Give the chief products of Arabia. Whence are they obtained?
 4. Why is Aden of great importance to the British?
- E. 1. Explain the following terms :—Bedouins, Sunnis, sheikh, emir, Haj.
 2. Trace the courses by which a pilgrim from Constantinople might reach Mecca.
 3. Where are the following :—Sana, Ras-el-Had, Hodeida, Tripoli, Erzerum, El-Haza, and Jebel-Shammar?
 4. What are the 'wadies'? How are they important?

IRANIA

This name is applied to the whole of the elevated region lying between the valleys of the Tigris and Indus. It embraces an area about equal to that of Arabia, and is politically divided into three parts—**Persia, Afghanistan, and Baluchistan.**

The approximate areas and populations, according to recent estimates, are as follows :—

Persia -	-	628,000 sq. miles :	9,500,000 inhabitants.
Afghanistan -	-	250,000	6,000,000
Baluchistan -	-	130,000	800,000

RELIEF.—The Plateau of Iran has an average elevation of about 4,000 ft., and rises towards the sea, hence the drainage is mostly continental. Towards the eastern borders of Persia the plateau falls considerably, the elevation probably being not more than 1,400 ft. above the sea level. This depression is occupied by extensive **sandy wastes** and **saline swamps**, known as **Kavirs**. From the **Great Salt Desert** of **Khorassan**, in the north of Persia, a belt of waste land extends through Kerman and Baluchistan to the **Thur** or **Indian Desert**. Towards the north-east of this area the land rises to the **Highlands of Afghanistan** and the lofty **Pamir Plateau**.

MOUNTAINS.—From the **Armenian Plateau** a number of parallel ranges, running mostly from the north-west to the south-east, extend through Persia, and are continued through Baluchistan. The **Kuh Dinar**, in Persia, is said to be at least 17,000 ft. high. The **Elburz Mountains**, to the south of the **Caspian Sea**, rise in **Mount Demavend** to an altitude of 19,000 ft.

The **Sulaiman Mountains**, 11,300 ft., and the **Kirthar Mountains**, 7,000 ft., border the plateau on the east.

From the Pamir Plateau a series of mountain ranges with their spurs occupy most of the north-eastern part of the country, and separate some of the most elevated valleys in the world. The **Hindu Kush**, 25,000 ft., extend from the Pamir in a south-westerly direction, and are continued by several branches, of which the **Koh-i-Baba** (*Koh*, Persian = mountains), the **Siah Koh** (Black Mountains), and the **Safed Koh** (White Mountains) are the chief. On the north of the plateau these mountains extend towards Krasnovodsk, on the Caspian.

CLIMATE.—The climate is on the whole exceedingly dry, with great heat in the valleys and extreme cold in the highland districts, especially in Afghanistan. The prevailing winds are dry; those from the Black and Caspian Seas are robbed of their moisture by the Armenian and Elburz Mountains, while the ranges on the south coast arrest the moisture from the Indian Ocean. The only district where the rainfall is abundant is the coast strip lying between the Elburz Mountains and the Caspian Sea.

DRAINAGE.—The larger part of Irania has a continental drainage, the rivers draining into lakes or losing themselves in the desert.

1. **Rivers draining into the Indian Ocean.**—The principal are the **Karkhah** and the **Karun**, which join the **Shat-el-Arab**, and the **Kabul**, a tributary of the Indus, which drains North-eastern Afghanistan.

2. **Rivers draining inland.**—The **Sefid Rud** (*Rud*, Persian = river) and the **Atrek** flow into the **Caspian Sea**. The latter river forms the boundary between Persia and Russian Central Asia. The north-west corner drains into **Lake Urumia**, a salt lake of considerable area.

The largest river draining inland is the **Helmand** (700), which drains a large part of Southern Afghanistan and flows into the great **Hamun** or **Sistan** swamp. Its chief tributary is the **Arghandab** (*ab*, Persian = water). North of the Helmand basin the **Heri Rud** and the **Murghab**, after draining important and fertile valleys, lose themselves in the deserts of Russian Turkestan. The **Amu**, which forms the boundary between Afghanistan and Bokhara, drains the valleys of Afghan Turkestan.

PRODUCTS.—Cultivation cannot be carried on without irrigation. The water for this purpose is supplied by canals from the rivers, or by wells supplied by underground channels called **Karezes**, which are often carried for a considerable distance into the mountains, until beds containing water are reached.

The only district containing extensive forests is the Caspian slope of the Elburz Mountains. Here a great variety of fine timber trees, including the valuable **boxwood**, grow profusely. The **date palm** flourishes in the south and south-west. **Fruit-trees** (cherry, peach, plum, &c.) are abundant. **Grapes**, **figs**, **pomegranates**, **sugar**, **rice**, **cotton**, **silk**, **tobacco**, **madder**, and **indigo** are cultivated in the lowland valleys.

The highlands are occupied by nomad pastoral tribes, who rear horses and two-humped camels. Goats yield valuable hair, fat-tailed sheep are the chief animal food, and mules are the chief beasts of burden.

Among the wild animals the lion, tiger, leopard, hyæna, wolf, jackal, wild ass, and wild goat may be mentioned.

The chief exports of Persia are dried fruits, opium, cotton, wool, silk, carpets, pearls, gums, and boxwood.

MEANS OF COMMUNICATION AND TOWNS.—(1) Persia.—There are a few short roads leading from the capital, Teheran; the other routes are mere tracks. The river Karun is navigable for about 100 miles above Mohammera.

FIG. 187.—IRANIA.



Longmans & Co. London & New York.

The capital is **Teheran** (220), situated to the south of the Elburz Mountains. **Tabriz** (200) is the chief seat of trade between North-western Persia and Trebizond. **Ispahan** (80), once the capital and a place of much importance, is situated in a fertile plain and is still a place of considerable trade. **Meshed** (70), in the north-east, on a tributary of the Heri Rud, is a great trading centre and is regarded as a sacred city by the Shiah Muhammadans. **Shiraz**, noted for its roses, grapes, and nightingales, is situated in one of the most lovely valleys of Persia. **Hamadan**, **Yezd**, and **Kerman** are the only other inland towns of importance.

Ports.—**Bender Abbas**, on the strait of Ormuz, **Bushire** further north, and **Mohammera**, on the Shat-el-Arab, are the principal ports on the Persian Gulf. **Resht** and **Balfrush** (50) are the chief ports on the Caspian.

(2) **Afghanistan.**—From India two main roads cross the Sulaiman Mountains. The **first** starts from Peshawar, follows the Kabul River, through the **Khaibar Pass** to **Jellalabad** (noted for its heroic defence by Sir Robert Sale in 1841–2), thence through the **Khurd Kabul Pass** to **Kabul** (150), the capital, and a great centre of trade. Here the road divides, one branch going south to **Ghazni** and on to **Kandahar** (31), the chief town in Southern Afghanistan; while the other road crosses the Hindu Kush by the **Bamian Pass** and branches northward to **Balkh**, **Kunduz**, and **Faizabad**, in Afghan Turkestan, and westward to **Herat**.

The **second** starts from Sukkur, on the Indus, whence a railway leads to Pishin, one branch ascending by the **Nari Pass**, while the other follows the **Bolan Pass** and passes by the fortress of **Quetta**. From here a road leads to **Kandahar** and on to **Herat** (20), a place of great strategical importance, situated in the fertile valley of the Heri Rud, and commanding the road from the west to India.

(3) The only town of any pretensions in Baluchistan is **Kelat**.

PEOPLE AND RELIGION.—(1) The **Persians** belong mainly to the **Aryan** race, although considerable numbers of the Semitic (Arabs, &c.) and Mongolian (Turkomans, &c.) races are found. They are polite, courteous, and to a certain extent refined in their manners; artistic in their tastes; but rather cruel in their dispositions. The Persians are mostly **Muhammadans** of the **Shiah** sect, who regard the descendants of the prophet as having a higher claim to veneration than the caliphs who succeeded Muhammad. There are still a few **fire-worshippers**, or followers of Zoroaster, in the desert districts.

(2) The **Afghans** and **Baluchis** are turbulent and warlike, and consist of a number of tribes of whom the **Ghilzais** and **Duranis** in Afghanistan, the **Usbegs** of Afghan Turkestan, and the **Brahuis** and **Baluchis** of Baluchistan are the chief. The **Afghans** are mostly **Sunnite** Muhammadans like the Arabs, while the **Baluchis**, like the Persians, belong mostly to the **Shiah** sect.

GOVERNMENT.—(1) **Persia** is under the rule of the Shah, the whole of the revenue of the country being at the disposal of the Sovereign. Recently, however, Representative Government has been introduced, with the Shah as president of a Legislative Assembly.

(2) **Afghanistan** is at present under the rule of the **Amir of Kabul**. Many of the mountain tribes are practically independent.

(3) **Baluchistan** is chiefly under British influence. The principal chief, the **Khan of Kelat**, is subsidised by the Indian Government, while a considerable distance around **Quetta**, at the head of the Bolan Pass, is under British administration.

EXAMINATION PAPERS

- A. 1. What does the term Irania mean? Give the boundaries.
 2. Describe the position and direction of the mountains of Irania and name the principal ranges.
 3. Why does a large part of Irania drain into the Sistan swamp?
 4. Explain the terms 'Kavirs' and 'Karezes.'
- B. 1. How do you account for the deserts of Irania?
 2. What are the chief products of—(1) the Caspian districts, (2) the highlands, (3) the lowlands of Persia?
 3. What are the following, and where are they situated:—Khorassan, Hamun, Sefid Rud, Safed Koh, and Heri Rud?
 4. What peoples inhabit Irania? Say what you can of them.
- C. 1. What do you know of the government of Eastern Irania?
 2. Why are the situations of Herat, Kandahar, Quetta, and Kabul of special importance?
 3. Give the position and say all you can of Tabriz, Shiraz, Bender Abbas, river Karun, Bamian Pass, Khurd Kabul Pass, Resht Bushire, and Meshed.
 4. Trace the route of a trader from Trebizond to Peshawar.

THE INDIAN EMPIRE

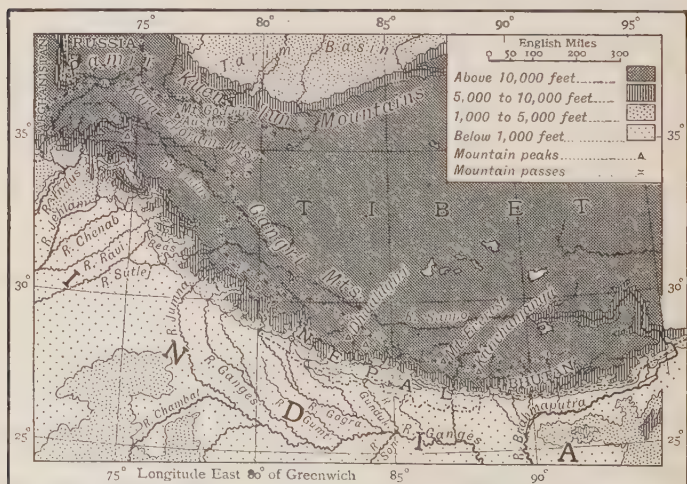
India has been called the 'fairest jewel in the British Crown,' and in many ways the metaphor is an apt one. Her natural advantages are numerous: she is compact and self-contained; her frontiers are natural barriers; the climate is milder than that of most other countries in the same latitude; the soil is, on the whole, wonderfully fertile; and the productions are abundant and of great variety. In point of population the Indian Empire is the second country in the world. More than a quarter of the world's inhabitants belong to the British Empire, and of these three-quarters are in India; moreover, the people of India are probably the most advanced of all the races who inhabit the Tropics.

When Great Britain first obtained sway in India the country was torn with internal strife. Little by little, harmony has taken the place of discord; the people have settled down to habits of industry and self-improvement; agriculture is making progress; education, arts and industries are making rapid headway; a network of railways covers the country; canals are being constructed; forests are preserved; and India is fast taking her place amongst the commercial nations of the world.

The Indian Empire of to-day is the result of gradual growth. From a collection of separate kingdoms, in which unity was practically unknown, has developed a single empire, under one central authority, of which the parts are bound together by national ties.

It occupies the whole of the central triangular peninsula on the south coast of Asia, and a considerable portion of the eastern peninsula. It stretches inland as far as the great Himáláyan ridge on the north, Persia on the west, and to within 300 miles of the Pacific coast on the east. It thus extends over **40 degrees of longitude** and **30 degrees of latitude**, or **2,000 miles** from north to south, and **2,500 miles** from east to west. In area it is about **1,800,000 sq. miles**, or nearly one-sixth of the whole British Empire.

FIG. 188.—THE HIMÁLAYAN SYSTEM.



POSITION AND BOUNDARIES.—It lies between 8° and 36° N. lat. and between 67° and 94° E. long. The whole of the peninsular portion of India is, therefore, within the Tropics, and the most northern part is in the latitude of the extreme south of Europe. The distance from London to Bombay is 6,300 miles, and to Calcutta about 8,000 miles. Madras time is used throughout the country.

India is bounded on the north by the **Himáláya Mountains**; west by the **Suláiman Mountains** and **Arabian Sea**; and east by the **Bay of Bengal** and the mountains of **Assam**.

Fig. 189.—INDIA: PHYSICAL.



RELIEF.—The surface may be divided into—

1. The Northern Mountain System.
2. The Great River Plain of the Ganges, Indus and Brahmaputra.
3. The Plateau of the Deccan, occupying almost the whole of the peninsula proper.
4. A hilly region between the Deccan and the Great Plain.
5. Burma.

The **Himálayas** ('Abode of Snow') extend over a distance of 1,500 miles from west to east, and contain the highest peaks in the world. Commencing in the **Pamir Plateau** ('the Roof of the World'), the system has a general south-easterly direction, and consists mainly of two great parallel ranges. The southern range has the greatest elevation, and includes **Mount Everest**, 29,000 ft.; **Káncchanjangá**, 28,200 ft.; and **Dhwalagiri**, 26,800 ft. On the south the system rises from the plain by successive ridges of increasing height, and many spurs are given off, forming the Hill States in which live the hardy tribes who are partially or entirely independent of British control. The central ranges are snow-clad and have vast glaciers in the upper valleys.

North of the **Himálayas** proper are the **Gangri** and **Kara-Koram Mountains**, which are also considered to form a part of the **Himálayan System**.

The **Gangri Mountains** form the southern edge of the **Tibetan Plateau**. The **Kara-Koram Mountains** connect the Pamir and Tibet table-lands, and contain a peak, **Godwin-Austen**, 28,250 ft.

The **Suláiman Mountains** lie mostly in Afghanistan, and are a very rugged range, of much inferior height to the **Himálayas**. They are chiefly of note because of the famous passes leading into India—viz. the **Khyber Pass** (Khaibar), from **Peshawar** to **Jellalabad**; the **Gumál Pass**, leading north-west to **Ghazni** and south-west to **Kandahar**; the **Bolan Pass**, leading to **Quetta**, in **Baluchistan**.

The **Great River Plain** sweeps round from the head of the **Bay of Bengal**, bordered by the **Himálayas** on the north and the edge of the **Deccan** on the south, to the **Arabian Sea**. This plain is very level, and is in most parts remarkably well watered by tributaries of the Ganges, Brahmaputra, and Indus. The south-west portion of the plain consists of a desert known as the **Great Indian Desert**, very dry and in parts saline. The Ganges Basin is extremely fertile, and has a teeming population.

The **Deccan** is the plateau which occupies Southern India, and is of great size, with much variation in height and character of surface. The western edge of the plateau approaches close to the sea and is very steep and high. The surface gradually slopes off to the east, where the edge is of less height, and generally further from the coast than on the west. The highlands forming the western border are the **Western Gháts**, and those on the east

the **Eastern Gháts**. The plateau is much less thickly peopled than the Great Plain, especially in the north, where it joins the Great Indian Desert. Many ranges of hills and scattered peaks diversify the surface of the Deccan. The plateau proper ends towards the south of the **Pálghát Gap**, 1,000 ft. in elevation, immediately south of the **Neilgherry (Nilgiri) Hills**.

The **Pálghát Gap** is a remarkable depression with highlands to the north and south, and affords an easy means of communication between the opposite coasts.

SOUTHERN HIGHLANDS.—The **Arávali** (Aravulli) Mountains occupy the elevated region which extends from the Deccan in a north-west direction.

The **Vindhya Mountains** (on the northern side of the **Narbadá Valley**) form the southern edge of this detached highland district, and on the southern side of the same river valley lie the **Satpura Mountains**.

The **Western Gháts** rise very abruptly from the sea, to a height of over 6,000 ft. in places.

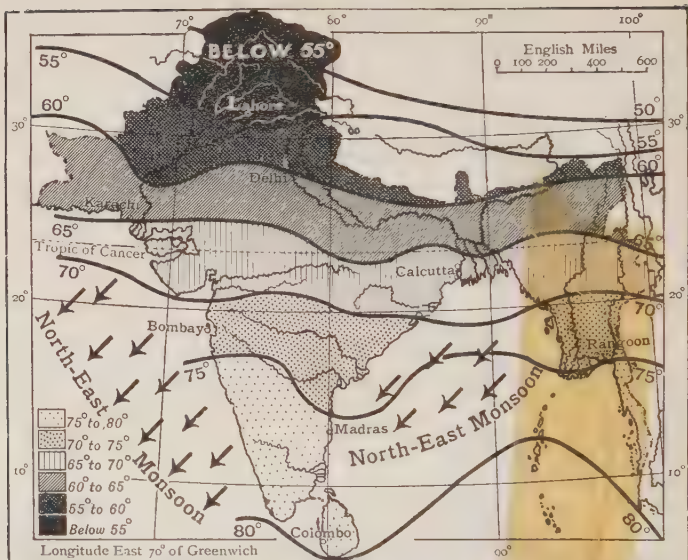
The **Eastern Gháts** form a less continuous and well-defined range, and the highest point is 5,000 ft.

The **Neilgherry (Nilgiri) Hills** lie in the south of the Deccan just north of the **Pálghát Gap**, and reach a height of 8,500 ft. The **Anamalai Hills**, of similar height, are south of the **Pálghát Gap**. The **Cardamom Mountains** extend southwards to **Cape Comorin**.

BURMA is a mountainous country, the more or less parallel ranges in the north being a continuation of the Himalayan system. The elevation becomes less towards the south and falls away into flat country along the lower course of the river Irawadi. Rivers flow along these parallel ranges towards the sea, and bring down the great quantities of water caused by the melting of the snow upon the high ranges in summer.

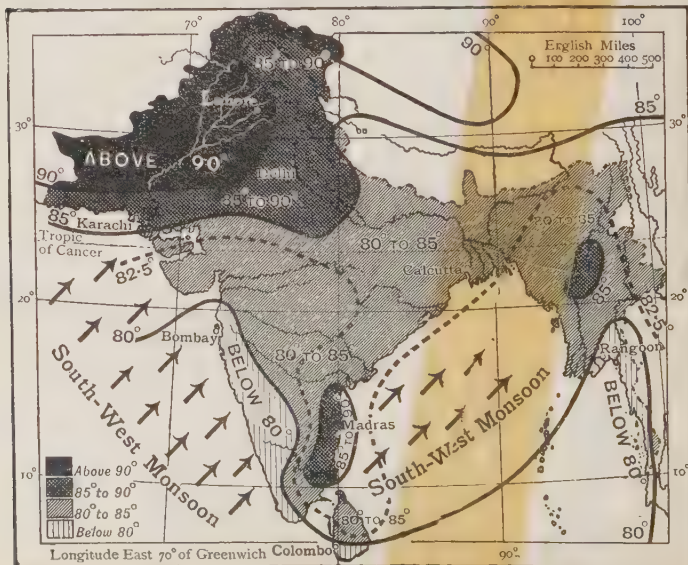
COAST LINE.—The coast of India is almost everywhere sandy. On the west, to the north of Bombay, the river mouths are almost rendered impassable by sandbanks. South of Bombay the nearness of the mountains and their unbroken character cause the coast to have no rivers of importance. On the east the shores are very low, flat, and shallow, so that large vessels cannot approach close to the land. At certain seasons this coast is unapproachable by vessels owing to the great surf. The east coast rivers are all shallow and sand-blocked at their mouths. The western coast has an abundant rainfall and luxuriant vegetation. The eastern coast is in places very dry and bordered by desert. The western coast south of Goa is called the **Malabar Coast**. The eastern coast south of the Godáviri is called the **Coromandel Coast**.

FIG. 190.—INDIA: JANUARY ISOTHERMS.



Emery Walker sc.

FIG. 191.—INDIA: JULY ISOTHERMS.



Emery Walker sc.

FIG. 192.—INDIA: RAINFALL DURING SOUTH-WEST MONSOON: JUNE TO OCTOBER.

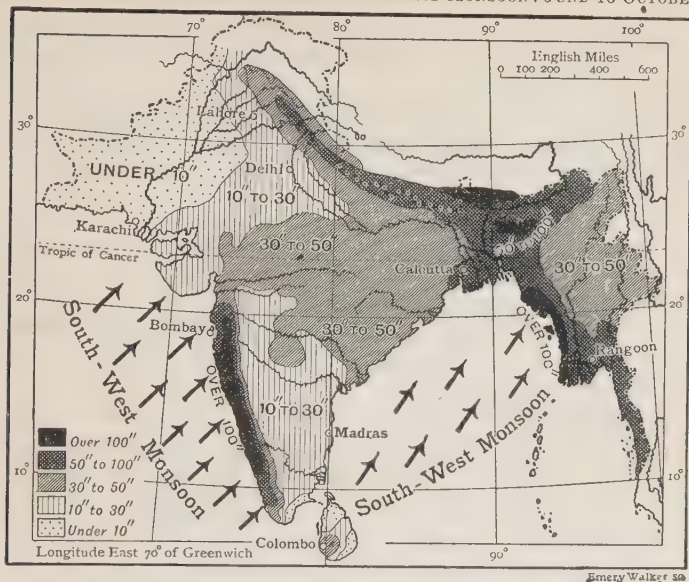
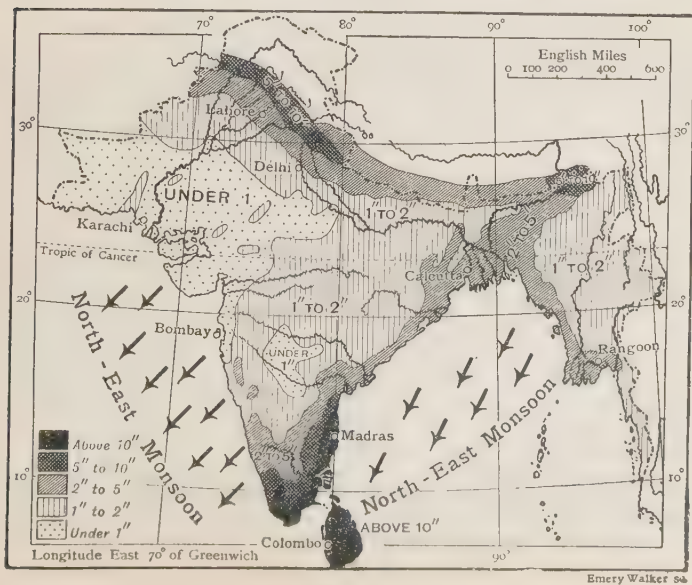


FIG. 193.—INDIA: RAINFALL DURING NORTH-EAST MONSOON: NOVEMBER TO FEBRUARY.



CAPIES.—Comorin, the southernmost point of the mainland, a low, rocky point. **Dondra Head** is the most southerly point of Ceylon.

SEAS, &c.—On the east, Bay of Bengal, Palk Strait, Gulf of **Manaar**; on the west, Arabian Sea, Bombay Harbour, Gulfs of Cambay and Cutch.

The **Rann of Cutch** is very peculiar, being at certain seasons quite dry and at other times covered with water. **Palk Strait** is shallow, with many rocks and islands, and is therefore difficult of navigation; only one channel suitable for moderately large vessels exists.

ISLANDS.—Ceylon, 25,000 sq. miles, forms a separate colony under the British Crown. The **Laccadive** and **Maldive** Islands are low reefs to the west and south-west. The **Andaman** and **Nicobar** Islands are in the Bay of Bengal.

The **Laccadive** and **Maldive** Islands are coral groups lying to the west and south-west of India. They consist of great numbers of very small and low islets extending over great expanses of sea with many coral reefs. The only product of commercial value is the cocoa-nut. The **Laccadives** are included under the government of India. The **Maldives** are a dependency of Ceylon. The **Andaman** (2,500 sq. miles) and **Nicobar** (425 sq. miles) Islands are hilly groups lying in the southern part of the Bay of Bengal, and are covered with dense and luxuriant vegetation. The former islands possess at **Port Blair** a penal settlement for India. Both groups are inhabited by a considerable population of fierce and savage character, and are under the control of a Chief Commissioner.

CLIMATE AND RAINFALL.—On account of its great size and the variety of its surface, the climate of India is by no means of uniform character throughout the country, but a very large part is distinctly tropical. India may be said, speaking broadly, to have a hot, a rainy, and a cool season in the year; but this description is not applicable to some very extensive districts. Compared with the British Isles, the hot season is the English spring (March, April, and May), the rainy season from June to October, and the cool season from November to February.

The rainfall is exceedingly variable in quantity, and the rainy season is by no means in the same months throughout India. The wettest regions are the hills in North-eastern India, where, on the **Khási Hills**, about 600 inches has been recorded in a year, and the **Western Gháts**. On the other hand, the valley of the Indus is dry, and over a large area almost rainless. There is also a great difference between the amounts of rain falling on the eastern and western coasts.

Special Causes affecting the Climate of India.—(1) The prevailing winds, known as **monsoons**, blow for six months from the south-west and for six months from the north-east. These winds, in fact, correspond with the trade-winds of the oceans.

The **south-west** monsoon is rain-laden and causes the heavy downfall upon the **Western Gháts**; also in the Ganges Valley and on the northern and north-eastern hills. Much of the intervening country receives but little rain owing to the lack of mountains there.

The **north-east** monsoon brings the rain to the eastern coast, but the amount is much less and more uncertain than that of the regions most affected by the south-west monsoon.

The **monsoons** are affected even in direction by the contour of the surface. Thus, the south-west monsoon is diverted by the **Himálayas** and becomes a south-east wind, blowing up the Ganges Valley. Again, the south-west monsoon before striking the north-west of India has been affected by blowing over large land surfaces and bears comparatively little rain.

(2) The position, direction, and height of the **Himálayas** cause them to act as an effectual barrier to the piercing winds from the table-lands of Tibet and adjacent countries.

(3) The very low elevation of the eastern coast plains and of the Great Indian Desert causes those regions to suffer from drought because of the great height at which the clouds pass over.

RIVERS.—The rivers of India are divisible into two groups:

(a) Those draining the **Himálayas** and the **Suláiman Mountains** and the northern slopes of the central hills—viz. the **Ganges**, **Brahmaputra**, and **Indus**.

(b) Those draining the **Deccan** and the southern slopes of the central hills—viz. the **Mahánadí**, **Godávári**, **Kistna**, **Penner**, **Palar**, **Pennair**, and **Cauvery** flowing to the east; the **Narbadá** (Nerbudda) and **Tápti**, flowing west. The **Lúni** flows from the **Arávali Hills** to the **Rann of Cutch**, through the plain of **Rajputana**.

The **Ganges** is by far the greatest and most useful river in India. It has a more constant flow than the Indian rivers generally, and is, consequently, of greater use in navigation and irrigation. The rivers of the **Deccan** flow between high banks and are very variable in volume, thus resembling the rivers of Spain. The **Brahmaputra** is a great and steady stream, but only its lower course is in India. Almost every river in India is difficult of access by ships at its mouth owing to sandbanks, which are often of a shifting nature.

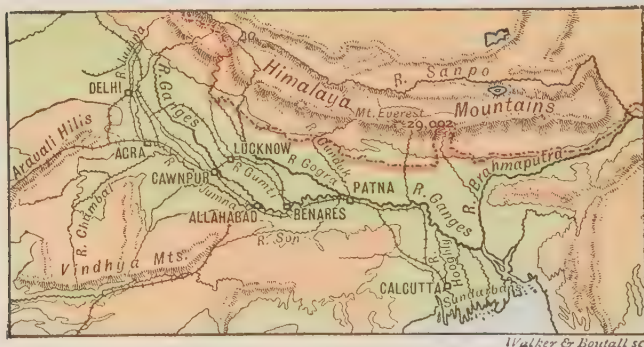
The **Ganges** (1,500 miles), the sacred river of India, rises in the **Himálayas** to the north of the southern chain, through which the river makes its way in deep gorges. The river is navigable almost directly it reaches the plain and continues to be so to the sea. It enters the Bay of Bengal by many mouths after forming a vast delta, in which are swampy districts called **Sundarbans** (Sunderbunds). The **Hooghli** (Hugli) is the chief mouth of the Ganges, but its navigation is rendered dangerous by shifting sandbanks and a very rapid current. The Ganges has many tributaries, especially on the left bank, where the chief are the **Gúmti** (Goomtee), **Gogra**, and **Gunduk**. On the right bank are the **Jumna**, a **Himálayan** stream receiving the **Chambal** (Chumbul) from the south; and the **Son** (Sone). The Ganges Valley has a vast population. The chief cities in the Ganges basin are **Delhi** and **Agra** on the **Jumna**, **Allahábád** at the confluence of the **Jumna** and **Ganges**, **Cawnpur**, **Benares**, and **Patna** on the main stream, **Calcutta** on the **Húgli**.

The **Brahmaputra** rises near the Ganges, but is compelled by the nature of the surface to flow eastward, and enters India on its north-east frontier after a course of nearly 1,000 miles. In India it is a navigable stream and

joins the Ganges before entering the sea. In passing into India this river falls a great height, while flowing through mountainous country inhabited by tribes so hostile to travellers that until very recent years much uncertainty existed as to the course of the Brahmaputra. Recent travellers have shown the identity of the Brahmaputra with the **Sanpo**, which has long been known in its upper course.

The **Indus** (1,700 miles) rises in the same district as the **Ganges** and **Brahmaputra**, and flows for some hundreds of miles through the **Himalayan** system. The river passes through gorges, compared with which the cañons of Colorado are but small. One such gorge is said to be 14,000 ft. in depth. On the left bank the Indus receives the famous five rivers—**Sutlej**, **Beas**, **Chenáb**, **Jehlam**, and **Rávi**—which when united form the **Panjnád**. On the right bank the affluents are simply mountain torrents. On the left bank, after receiving the **Panjnád**, the Indus is bordered by the Great Indian Desert, from which no stream of importance flows. The **Indus** is navigable with difficulty, and but little traffic passes along it now that a railway has

FIG. 194.—THE RIVER GANGES.



been constructed from Karáchi to the Punjab. The delta is much less in size than that of the Ganges. The chief towns in the Indus basin are **Lahore** on the **Ravi**, **Haidarábád** on the main stream, **Kabul** and **Peshawar** near the **Kabul**.

The **Mahánadí**, **Godávari**, **Kistna** or **Krishna**, and **Cauvery**, are alike in forming large deltas and in their difficulty of navigation, particularly the **Cauvery** and **Kistna**. The **Cauvery** is the most southerly river of considerable size in India, and has a large part of its course through the plain east of the Deccan. The **Godávari** (800 miles) is the longest and has the largest basin.

The **Narbadá** (735 miles) and the **Tápti** (400 miles) flow between the Deccan proper and the northern extension. The basins of these two streams are sharply divided by the **Satpura Mountains**. The **Tápti** is navigable only by small vessels near the mouth.

LAKES.—India possesses very few natural lakes, but there are some large artificial reservoirs worthy of the name of lakes, and thousands of tanks, all of which have been constructed to supply water for irrigation. **Lake Chilká**, near the delta of the **Mahánadí**, is a large expanse of shallow salt water, and being connected with the sea is really a lagoon.

Lake Kola, near the **Godáviri**, is a shallow fresh-water lake.

FERTILITY.—Much of the soil in the **Great Plain** and in the **Deccan** is of great fertility, but there are large areas of barren soil in the Indian Desert of **Rajputana** and **Sind**. India is dependent in a remarkable manner upon the quantity and regularity of the rainfall, and vast works have been accomplished in ancient and modern times to avert the consequences of drought. The Great Plain has a network of **canals** fed by the great rivers, and an innumerable number of **wells** in the plains immediately to the south of the great mountain system. In the hilly regions great **reservoirs** have been formed by the damming up of valleys. Ceylon possesses ancient reservoirs of great size, indicating a much larger population in early times. In parts of the Deccan the surface is composed of a peculiar **black soil** possessing a remarkable power of retaining moisture for long periods. The canals have a united length of over 30,000 miles. In the **Punjab** and on the lowlands east of the **Deccan Plateau** the flood waters of the rivers are stored in canals.

PRODUCTS.—1. **Agricultural.**—Agriculture is the employment of about three-quarters of the population, and nearly the whole of this vast number depend upon the rains for their existence. The chief crops raised may be classified into: 1. **Foods**. 2. **Fibres**. 3. **Oil-seeds**. 4. **Drugs, beverages, &c.**

1. **Foods**: **Rice** in the valley of the Ganges, along the coast of Madras, and in Burma; **sugar-cane** in the same districts; **wheat** in the Punjab and the United Provinces. **Millet**s and other grains, such as **maize** and **pulse**, are grown all over the country.
2. **Fibres**.—**Cotton** is grown chiefly in the Deccan; **jute** along the lower course of the Ganges; **hemp** and **flax** in many parts; **silk** is obtained from the cocoons that are found in the northern forests.
3. **Oil-seeds**.—Oil-seeds of different kinds are grown all over the country. The most valuable are linseed, castor, rape, from which colza oil is made; cotton seeds, from which oil and oil-cake are made.
4. **Drugs, Beverages, etc.**—**Opium** is a drug obtained from the seed of the poppy, which is grown on a large scale in the United Provinces, Bengal, and Central India; **tobacco** in the Madras Presidency and in Burma; **tea** in Assam and Southern India; **coffee** and the **cinchona tree**, from the bark of which quinine is made, in Southern India; **indigo** in the valley of the Ganges.

The land is chiefly held in very small holdings, averaging only five acres, and the rent is paid as a land tax to the Government. The crops of temperate climes are mostly grown in the North-west, where the winter is about equal to the summer of Northern Europe. Though the whole of Bengal is not included in the tropics, the climate is tropical and the products are similar in character. It is usual for two crops to be produced in a year, one in winter and the other in summer.

2. **Forest Products.**—Vast forests formerly existed in India, and they are still considerable. They are chiefly in the hilly

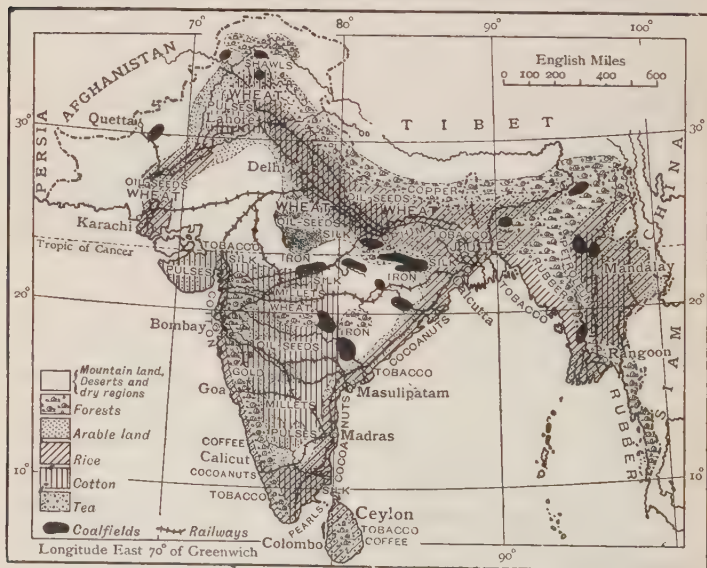
and swampy regions, especially in the **Sundarbans** and in the **Terai**, at the base of the **Himálayas**.

The chief are **canes**, **india-rubber**, **bamboo**, **conifers**, **cedars**, **teak**, **satin** and **sandal woods**, **acacia**, and **palms** of many kinds. The latter flourish near the coasts, the chief being **date**, **toddy**, **sago**, and **areca**.

3. Animals.—Domestic.—Elephant, **ox** and **buffaloes**, **camel** in the plains; **yak**, **goats**, and **sheep** in the mountains.

Wild.—Wild animals are extremely numerous and varied, and many lives are annually lost by the bites of snakes and by tigers, and much damage is done to crops. Some of the chief are **tiger**, **leopard**, and **lion**; **elephant**, **antelopes**, and **deer**; **bear**, **hyæna**, **wolf**, **jackal**, and **wild dog**; **monkeys**, **hog**, **ass**, **nylgái** (**nylgau**), **bison**, **buffalo**, and **gayal**. Of **reptiles**, the **crocodile** is

FIG. 195.—INDIA: VEGETATION, MANUFACTURES, AND RAILWAYS.



plentiful in the rivers and swamps. The deadly **cobra** is the most destructive of the snakes. Of insects, the **locust** and **white ant** are abundant and mischievous, and the **lac insect** is of commercial value by its production of **shellac**. Of birds, vultures and adjutant birds are numerous.

Fisheries.—The **pearl oyster** is obtained in the **Gulf of Manaar**.

4. Minerals.—**Coal**, **iron ore**, **gold**, **copper**, **salt**, **saltpetre**, and **diamonds**.

Coal of moderate quality is obtained in increasing quantities in many parts, and the industry is developing with the extension of the railways. There are several important coal-fields in **Bengal**. **Iron ore** is plentiful,

but in no place are coal, iron ore, and lime found in close proximity. **Gold** is obtained in the Western Gháts and **copper** in the Himálayas. **Salt** is obtained all round the coast, by evaporation in the Salt Desert, and in the Salt Hills of the Punjab, but not sufficiently for the population, and great quantities are imported.

MANUFACTURES.—Manufacture on a large scale in India has only recently begun to be developed, although in all parts of the country **local industries** are carried on to supply the immediate needs of the people. The factories are springing up chiefly in the large centres of population.

In agricultural districts products of the soil are prepared for the market. The following are the most important:—

Jute is manufactured in Lower Bengal; **opium** in the United Provinces, Bengal, and Madras; **tea** in Assam, the Punjab, and South India; **cotton** in the Bombay Presidency, and on a smaller scale in almost every province; **indigo** in the provinces in which it is grown; and **wool** in the Punjab and United Provinces. **Rice mills**, in which the grain is prepared for use, have been erected in Bengal, Madras, and Burma; and **cigars** are largely manufactured in Burma and the Madras Presidency.

TRADE.—The foreign trade of India is almost entirely by sea, and consists chiefly of an interchange of agricultural produce for manufactured goods; but the proportion of manufactured goods in the exports is steadily increasing with the use of modern machinery. The carriage of merchandise oversea is very largely in British vessels. Of the foreign commerce, 80 per cent. is carried on at Calcutta and Bombay. Of the imports, three-quarters of the total value are received from the United Kingdom, and one-third of the exports are to the same country. The trade over the land frontiers is mostly with Nepál, Kashmir, and Afghanistan.

MEANS OF INTERNAL COMMUNICATION.—Roads in India are few, and short in proportion to the extent of the country, and about four-fifths of those existing are unmetalled owing to the absence of stone in the plains. By river, communication is maintained for long distances on the Ganges and its tributaries and the lower course of the Brahmaputra. Canals are numerous in all the plains, especially in the Ganges Valley and the eastern lowlands. The **Buckingham Canal** is a salt-water canal from Madras to the mouth of the **Godáviri**. **Railways** are now rapidly securing most of the traffic. In 1919 the railways had a total length of 36,616 miles. Great lines now connect Bombay with Madras, Madras with Calcutta, Calcutta with the Punjab and Karáchi, Bombay with the Ganges Valley, and so with Calcutta. Communications across the Deccan are difficult from the nature of the surface, and the construction of the line from Bombay to Madras up the **Bhor Ghát**, 2,000 ft. high, was therefore considered a great triumph. In the far south, the **Pálghát Gap** affords a very convenient route from Goa and Calicut to Madras.

The ordinary gauge, as used in England, is that upon which all the great lines are laid; but in the hilly and mountain districts considerable lengths of narrow gauge of one metre in width, and even so narrow as 2 ft., have been constructed.

The narrow line up to Darjiling, in the southern spurs of the Himálayas, is the highest in the Old World.

FOREIGN TRADE.—Imports.—Manufactured cotton, metals, hardware and cutlery, sugar, railway plant such as engines

FIG. 196.—INDIA: TRADE WITH OTHER COUNTRIES, 1921-22.

with United Kingdom £132 millions.

with Japan £38m.

*with U.S.A.
£31mills.*

£8m. with France

and carriages, machinery and mill-work, oils, raw and manufactured silk, woollen goods, provisions, liquors, &c.

The imports are chiefly from the United Kingdom, Belgium, Austria-Hungary, the United States, the Straits Settlements, Germany, Japan and Java.

Exports.—Raw cotton, rice, wheat, cotton goods, oil-seeds, opium; also jute, tea, hides and skins, indigo, wool, leather, silk, lac, spices, saltpetre.

The exports are most largely to the United Kingdom, China, Straits Settlements, Germany, Egypt, the United States, and Belgium.

India sends to the United Kingdom jute, tea, oil-seeds, cotton, wheat, rice, indigo.

The United Kingdom sends to India cotton manufactures and cotton yarn, iron and steel goods, machinery, woollens, railway and other carriages, chemicals, &c.

SEAPORTS.—In the order of their commercial importance, Calcutta, Bombay, Rangoon, Karáchi, Madras, also Chittagong, Tuticorin, and Goa.

Bombay (1,175) has an unrivalled position for trade with Europe, and an excellent harbour at all seasons. Bombay is of modern growth, and has absorbed the trade of several ports to the northward on the same coast, especially of Surat, at the mouth of the Tápti, and Broach, on the Narbada, which have become almost inaccessible by the formation of sandbanks.

Calcutta (1,327 with suburbs), on the Húgli, is also a modern city, and has succeeded a number of ports higher up the stream, all of which have decayed through the silting up of the river. The navigation of the Húgli is very difficult and dangerous on account of the shifting nature of the sandbanks and the strength of the current.

Madras (526) lies on the low and sandy eastern coast, and all trade is pursued under great difficulties. A harbour has been constructed, and affords a fairly safe anchorage for ships.

Karachi (216), a little to the west of the Indus Delta, has a good artificial harbour, and has risen into importance in very recent years, owing to the construction of the railway to the north-west of India, from which wheat is exported. **Goa**, a Portuguese town on the west coast, has the advantage of a natural harbour, good at all seasons.

POPULATION.—319 millions (1921), or 175 to the sq. mile.

TOWNS.—In India there are 75 cities with over 50,000 inhabitants, 40 with 35,000 to 50,000, and 109 with 20,000 to 35,000.

Calcutta (1,327 with suburbs) was established in 1686 by the East India Company. It became infamous for the imprisonment of Europeans in the 'Black Hole of Calcutta' by Surajah Dowlah in 1756. Warren Hastings made Calcutta the capital of Bengal, and later of India. The Portuguese, Dutch, French, Germans, and Danes made settlements at various times in the neighbourhood of the Hugli. **Chandernagore** is still French territory. Calcutta is a fine city, with large palaces and gardens.

Bombay (1,175) the capital of the Bombay Presidency, is the chief port and manufacturing city in India. The city is built on the island of Bombay, in a splendid harbour, and is now in railway communication with the interior. Charles II. received the town as the dowry of his bride, the Infanta of Portugal, in 1661, and transferred it to the East India Company, who removed their headquarters from Surat to this city. Near Bombay are many rock temples connected with Brahmanism and Buddhism.

Madras (526), on the Coromandel coast, is the capital of the Madras Presidency and the third city of India. This city, like Calcutta and Bombay, has grown with the increase of British power and territory in India.

Haidarabad (400), on a tributary of the Kistna, is the capital of the Nizam's Dominions. It is surrounded by a high wall, and has many fine mosques and palaces.

Lucknow (240), on the **Gumti**, in Oudh, is the centre of the trade of the province, and has manufactures of articles of luxury. During the Indian Mutiny the English were twice besieged here by the natives, and twice relieved, first by Sir Henry Havelock, and next by Sir Colin Campbell. The ruins of the British Residency remain as left after the siege.

Benares (198), on the left bank of the Ganges, is a sacred city of the Hindus, and is much visited by pilgrims to bathe in the sacred Ganges. The city has many mosques and temples, and is approached from the river by great flights of steps. The river is navigable, but the city is chiefly of note for its religious importance.

Delhi (304), the capital of the Indian Empire. Several cities have been built on or near the site of Delhi, the last and greatest being built by Shah Jahan (Jehan) as the capital of the Mughal (Mogul) Empire.

Cawnpur (216), on the Ganges, is a very new town of British creation, and is an important railway centre, with much trade and many manufactures. It is infamous for the atrocities committed upon the British by Nana Sahib during the Indian Mutiny.

Bangalore (237), stands upon high ground in Mysore, and has a British Resident. Carpets are manufactured here.

Lahore (281), near the Rávi, is the capital of the Punjab, and is an ancient walled city.

Allahábád (157) is remarkably well situated at the confluence of the Ganges and Jumna, and has been of great importance from very early times. It is the capital of the North-West Provinces, and has important railway connections.

Agra (185), on the Jumna, was built by Akbar the Great, and was once the capital of the Mogul Empire. It is chiefly famous for the Taj Mahal, the tomb of Shah Jahán's wife, which is considered to be the finest specimen of Muhammadan architecture existing.

Patna (120) is on the Ganges, opposite to the confluence of the Gandak (Gunduk), and is well situated for trade. It is on the chief trade route to Nepál, and manufactures opium.

Poona (214), in the Deccan, to the south-east of Bombay, is the seat of government for Bombay in the hot season. It is a military depôt, and has many manufactures.

Ahmadaabad (274), in Bombay Presidency, was formerly one of the greatest cities in India, having nearly a million inhabitants, who were famous for their manufacture of rich silks.

Jaipur (120), or Jeypore, in Rajputana, is one of the handsomest cities in India.

Bareilly (129) is an important town in the north of the Ganges Valley.

Meerut (122), in the Doab, between the Jumna and Ganges, is an old city, and now a great military centre. The Indian Mutiny commenced here in 1857.

Srinagar (141) is the chief city of Kashmir, and is near the City Lake, famous for its floating gardens. It is a trade centre on the route to Eastern Turkestan over the Karakoram Pass (18,500 ft. high).

Nagpur (145) is the capital of the Central Provinces, and is a commercial and manufacturing town, with fine Hindú temples.

Baroda (94), at the head of the Gulf of Cambay, is the capital of the dominions of the Gáekwár of Baroda.

Surat (117), near the mouth of the Tápti, was formerly the chief centre of foreign commerce in India, and the first headquarters of the East India Company in India. It still has considerable internal trade.

Karáchi (216). *See* Seaports.

Gwalior, in Central India (104), famous for its great fortress.

Trichinopoli (123), on the Cauvery, was the capital of a powerful kingdom, and now manufactures cigars, silks, carpets, and jewellery.

Madura (138) is the chief religious town in Southern India, with a great pagoda dedicated to Siva.

Pesháwar (104) is a strongly fortified town some few miles from the entrance of the Khaibar (Khyber) Pass.

Dacca (119), formerly on the Ganges, is the ancient capital of Bengal, and was formerly famous for muslins. It is now some miles to the north of the river. The decay of Dacca is due to the great import of Manchester cottons.

Mysore (84) is the present capital of the State of that name in place of Seringapatam, which was defended by Tippoo Sahib in 1799.

Ráwal Pindi (101) is the great arsenal of North-West India.

Calicut (82), on the south-west coast, was the first Indian town visited by Europeans. Calico has derived its name from having been manufactured here.

Puri, on the east coast, near Lake Chilka, is a sacred town, being the seat of the great idol Juggernaut under the wheels of whose car religious devotees used to throw themselves at the annual feast, when the idol was

Golconda, in Haidarâbâd, is now a decayed city which was of great fame



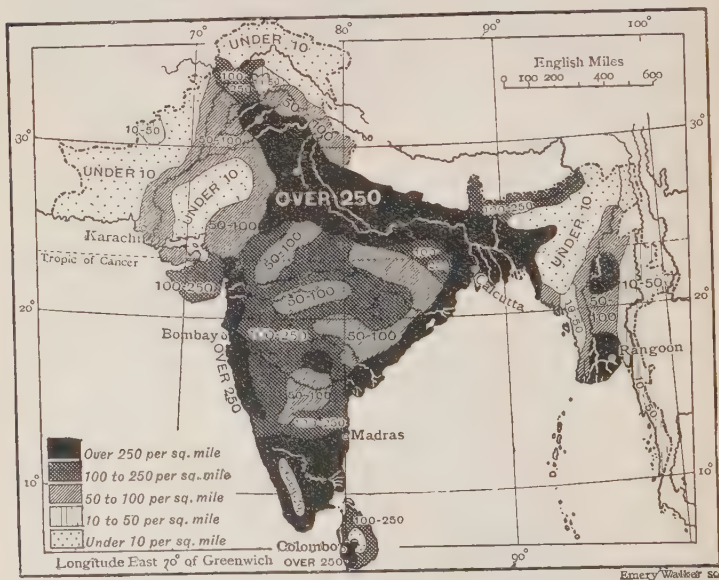
during many centuries for the diamonds which were cut and polished there. It was formerly the capital of a kingdom.

Secunderabad, in Haidarâbâd, is the largest military station in India.

Darjiling, in Bengal, on the lower slopes of the Himâlayas, is a summer resort for Europeans, and is well known amongst travellers for the splendid view of the great Himâlayan peaks.

FOREIGN POSSESSIONS IN INDIA.—French.—Pondicherry, Karikâl, Yanaon, and Mahé, in Madras; Chandernagore, in Bengal. The total area is 196 sq. miles, and the population 275,000.

FIG. 198.—INDIA: DENSITY OF POPULATION



Portuguese.—Goa, Daman, and Diu, all in Bombay. Total area, 1,558 sq. miles; population, 572,000. Goa has been held by Portugal for nearly four centuries.

PEOPLE AND LANGUAGES OF THE EMPIRE.—The number of races and tribes in India is very large, and the variety of languages and dialects larger still. Speaking generally, the races of India may be classified as **Aboriginal**, **Dravidian**, **Aryan**, and **Tibeto-Burman**.

1. **Aboriginal.**—These are the **Kolarian*** tribe, which are

* Some authorities connect the word *kuli* (coolie) with the generic name *Kolarian*.

found scattered to the north of the Great Plain and to the north of the Great Plateau. The **Bhils** of Indore and Rajputana and the **Santals** of Bihar are the best known.

2. **Dravidian**.—This race is mainly confined to South India and the Deccan, where they were driven by the Aryans. They are generally supposed to have entered India from the north-east, but a later theory is that they came by way of Persia, Baluchistan, and Sind, and the presence of the **Brahui** (an isolated Dravidian tribe) in Baluchistan supports this view. The chief languages of the Dravidian peoples are **Tamil**, **Telugu**, and **Kanarese**. A few isolated tribes retain the early characteristics of the race: such are the **Gonds** of Bastar and the **Todas** of the Nilgiris. The total Dravidian population is just under 60 millions.

3. **Aryan**.—This race came into India from the north-west and drove the Dravidian southwards. Although their influence has spread over the whole country, they were really established in the northern plain. The Aryan group of Indian languages can be traced to **Sanskrit**, the chief members of the group being **Bengali**, **Hindi**, **Marathi**, **Gujarati**, and **Punjabi**. The total Aryan population is over 221 millions.

4. **Tibeto-Burman**.—The people of this race are Mongolian, and inhabit Burma and the countries bordering on Tibet, *e.g.* Nepal, Sikkim, and Bhutan, and the Ladakh district of Kashmir. The language of Burma is **Burmese**, and of the Himalayan tracts, dialects of **Tibetan**. Population, $11\frac{3}{4}$ millions.

The **Europeans** in India number only 270,000, and **Parsis** and **Eurasians** number about 100,000 each.

GOVERNMENT.—The Indian Empire is a possession of Great Britain, and the **King of England** is its **Emperor**. Indian affairs in the British Parliament are under the special charge of the **Secretary of State for India**, who is assisted by a **Council of Advisers**, consisting of retired Indian officials of high standing and others having an expert knowledge of Indian affairs.

For direct rule in India the Emperor appoints a **Viceroy**, who bears the official title of **Governor-General**. He presides over two Councils. The first is a kind of Cabinet, called the **Viceroy's Council**, and consists of six members, who are in charge of various departments, as well as himself and the **Commander-in-Chief**, who is an extraordinary member. The departments are for **Finance**, **Foreign**, **Home**, **Legislative**, **Revenue** and **Agriculture**, **Public Works**, **Commerce** and **Industry**, **Army**, and **Military Supply**. The second is the **Legislative Council**, for making laws and regulations, which is partly elected and partly nominated. The members of the Viceroy's Council belong also to the Legislative Council.

The Empire is divided for purposes of administration into provinces.

Three **Governors**, those of **Bengal**, **Madras** and **Bombay**, are also nominated by the Emperor. All other rulers are appointed in India by selection from the most distinguished members of the Civil Service.

Four provinces are administered by **Lieutenant-Governors**—namely, **United Provinces of Agra and Oudh**, the **Punjab**, **Burma**, **Bihar** and **Orissa**.

Provinces or districts of smaller population or less importance are under a Chief Commissioner. Such are **Assam**, the **Central Provinces**, the **North-West Frontier Province**, **Baluchistan**, **Ajmere-Merwara**, **Coorg**, and the **Andaman and Nicobar Islands**.

Many States are under the control of their own princes or **Rajas**. In the largest of these British interests are watched by a **Resident** or **Agent**, who communicates direct with the Government of India. Such are **Kashmir**, **Haidarabad**, **Mysore**, the **Central India Agency States**, and the **Rajputana States**. Smaller Native States are controlled by the Local Government of the province in which they are situated.

There are now only two independent States in the Indian Empire; they are **Nepal** and **Bhutan**.

The **Laccadive Islands** are under the control of the Governor of Madras, and the **Maldivé Islands** under the Ceylon Government. **Aden** is administered by the Governor of Bombay.

DEFENCES.—The north-west frontier is protected by some fortresses and large military camps near the entrances to the great passes through the **Suláiman Mountains**.

CEYLON

Position and Size.—Ceylon is separated from the extreme south-east of India by **Palk Strait** and the **Gulf of Manaar**. A number of islands and rocks stretch across the Strait, and are known as **Adam's Bridge**. The island is 266 miles in length, and has an area of 25,000 sq. miles.

Physical Features.—The southern part of the island is very mountainous, but the northern part is low. The highest peak is **Pedrotallagalla** (8,300 ft.), but **Adam's Peak** (7,400 ft.) is the most conspicuous and the best known. The only river of importance is the **Mahavilla Ganga**, which enters Trincomalee Bay. The soil is fertile in the south, but less so in the north. Some lakes amongst the mountains were formed in ancient times as reservoirs for irrigation, but are not now so used.

PRODUCTS.—Tea, cinchona, rice, coffee, cinnamon, cocoa, tobacco, cocoa-nuts, and areca-nuts are the chief crops.

Coffee was formerly the most valuable, but diseases attacked the trees and the planters turned their attention to tea, which is now grown in great quantities.

Graphite is the chief mineral product.

TOWNS.—Colombo (244), on the west coast, is the capital and chief seaport. Kandy is the chief town of the interior. Point de Galle is a declining seaport, which is still visited by many steamers. Trincomalee is the headquarters of the British East Indian fleet.

POPULATION.—4½ millions, or 178 to a sq. mile.

The people are chiefly Sinhalese and Tamils, together with Eurasians, Europeans, and Moormen (descended from Arabs).

GOVERNMENT.—The island forms a Crown Colony under a Governor, with an Executive and a Legislative Council.

In 1505 Ceylon was settled by the Portuguese, from whom the Dutch took it in the seventeenth century. In 1795 the British seized the island, which at first was included in Madras, but in 1798 was created a separate colony.

NEPAL

NEPAL is an independent kingdom in the Himálayas, having a length of 500 miles and a breadth of 150 miles. It is inhabited by a warlike race, the Ghurkas, who profess Buddhism. The chief products are rice, oil-seeds, butter, timber, musk, and borax.

The capital is Khatmandu.

BHUTAN

BHUTAN is also an independent Himálayan State, with a length of 160 miles and breadth of 90 miles. The chief productions are rice, maize, millet, cloth, and musk. The people are called Bhutias. The capital is Punakhá, very strongly situated.

EXAMINATION PAPERS

- A. 1. Describe a coasting voyage from Karáchi to Calcutta, taking the shortest route round Southern India.
2. Give an account of the Deccan, showing its position, boundaries, slope, and character of surface.
3. Name the chief races and religions of India, and account for their existence there.
4. Say what you can of Pesháwar, Simla, Puri, Bombay, Goa, Lahore, Haidarábád, Adam's Bridge, the Rann of Cutch, Benares, Agra, and Dacca.
- B. 1. Show how the south-west monsoon affects the rainfall and agriculture in India.
2. Explain the cause of the great dip in the July isobar of 80°.
3. What influence has the Himálayan mountain system upon the summer and winter climate of Northern India?
4. Which parts of India are most thickly peopled, and why?
- C. 1. Name the rivers of India draining into the Bay of Bengal, show their sources, and describe their general character. Draw a sketch-map of the chief one.

2. Describe the government of India by the British, and show the extent of the power of the Native Princes.
 3. Name the chief manufactures of India. Name some of the chief cities connected with them, and mention any circumstances that have affected their growth in recent times.
 4. Describe the climate of India in general terms, and indicate any general or local causes.
- D.**
1. Describe the Himálayas, naming at least three peaks and the chief rivers rising in the system.
 2. Name the chief vegetable products of India, and group them as far as possible according to the districts in which they chiefly flourish.
 3. Show how merchandise may pass between Karáchi and Lahore, Delhi and Calcutta, Bombay and Allahábád, Bombay and Madras, and Madras and Calicut.
 4. Where and what are Ráwal Pindi, Poona, Quetta, Kandy, Doab, The Terai, Bhor Ghat, Malabar Coast, Sundarbans, Chilka, The Carnatic, and Pondicherry?

INDO-CHINA

AREA, POPULATION, DIVISIONS, &c.—This large peninsula has a total area of over 800,000 sq. miles, and a population estimated at about 35 millions. It is also known as Further India and the Eastern Peninsula, and is now divided between England, France, and Siam. In the Northern part of the interior numerous tribes, of whom the **Shans** are the chief, are practically independent.

The estimated area and population are as follows :—

1. British Territory, consisting of—

Burma	231,000 sq. miles,	13,000,000 inhabitants.
Shan States	68,188 „	1,250,000 „
The Straits Settlements	1,600 „	882,000 „
The Federated Malay States.	27,500 „	1,300,000 „

2. French Territory, consisting of—

Lower Cochin-China	} 256,000 sq. miles,	19,000,000 inhabitants.
Tonking		
Annam } Protected		
Cambodia } States		

3. Independent Siam 194,000 sq. miles, 8,000,000 inhabitants.

RELIEF.—Of the interior of the peninsula but little is known. The northern portion consists chiefly of a highland district, with parallel mountain chains running north and south, separated by narrow river valleys which widen out as they approach the sea into the fertile alluvial plains of **Lower Burma, Siam** and the **Lower Mekong**, and **Tongking**. The principal mountain ranges are the **Patkoí Mountains**, on the borders of Assam ; the **Arakan-**

Yoma Mountains, lying west of the Irawadi; and the **Cochin-Chinese coast range**, between the Mekong and the sea.

COAST-LINE.—The coast-line is very extensive. Between the **Gulfs of Martaban and Siam** the long **Peninsula of Malacca** extends southwards nearly to the Equator, narrowing at the **Isthmus of Kra** to about 60 miles. The principal capes are **Negrais**, at the west of the Gulf of Martaban; **Romania**, at the extreme south; and **Cambodia**, in Lower Cochin-China. The **Islands of Penang and Singapore**, in the **Strait of Malacca**, are important trading centres, with excellent harbours.

CLIMATE.—The peninsula being situated between the Indian and Pacific Oceans, and lying almost entirely within the Torrid Zone, has a **moist, hot climate**, unhealthy for Europeans. The monsoons, especially the south-west, cause an abundant rainfall, and the vegetation is most luxuriant.

RIVERS.—The peninsula is well watered, but the rivers, although large, have their navigation much impeded by rapids.

The **Irawadi** rises in Tibet, drains the greater part of Burma, and enters the Gulf of Martaban by an extensive delta. It is navigable to Bhamo, nearly 1,000 miles from its mouth. The **Sittaung** and the **Salwin** also flow into the Gulf of Martaban. The **Menam** drains Siam and flows southwards to the head of the Gulf of Siam. The **Mekong** (1,800) is the longest river of the peninsula, and forms a vast delta at its entrance to the China Sea. In Cambodia it receives the waters of a large lake, the **Tonli-sap**, noted for its fisheries. The **Songka** flows into the Gulf of Tongking.

PRODUCTS.—Owing to the heavy rainfall, great heat, and fertile soil, **vegetation** is most luxuriant. Dense forests cover the country.

Teak, gum-trees, the **gutta-percha plant**, **bamboo**, **dye-woods**, &c., grow in profusion. **Rice** is the chief object of cultivation on the deltas of the great rivers. Burma exports more rice than any other country in the world. **Cotton, tobacco, indigo, sugar-cane, spices, tea, coffee, sago, maize, wheat**, and **cutch** are also important products.

Of the mineral products, **rubies, jade for China and Japan, gold, petroleum**, and **coal** are found in Burma. **Tin** is the most important product of Malacca.

The chief wild animals are the **elephant, rhinoceros, tiger, leopard, wild boar**, and **crocodile**. **Snakes, birds, and apes** abound in the woods, and **fish** in the rivers and lakes. The principal domestic animals are the **buffalo, ox, elephant, and horse**.

MEANS OF COMMUNICATION.—The **Irawadi** is the principal means of communication in Burma. **Two railways** start from Rangoon—one going to Prome, while the other ascends the valley of the Sittaung to Mandalay, and thence northwards. A railroad from Bangkok to Singapore is being constructed.

DIVISIONS AND TOWNS.—Lower Burma consists of the provinces of **Arakan, Pegu, Irawadi, and Tenasserim**. **Rangoon** (341), on the Irawadi, is the capital and chief port. **Bassein** is another port on the Irawadi delta. **Akyab** is the chief port of Arakan. **Maulmain**, on the Salwin, is the prin-

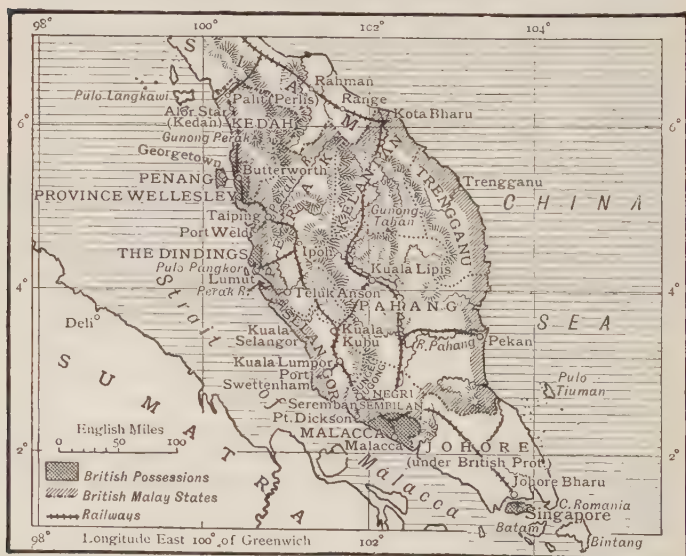
principal port of Tenasserim. Of the inland towns, **Prome** and **Pegu** are the most important.

In **Upper Burma** (annexed in 1886), the chief towns are on the **Irawadi**; **Mandalay** (149) is the capital. **Bhamo**, further north, is an important trade centre; caravans start from here for **Yunnan**.

In the **Malay Peninsula** the **Straits Settlements** consist of—

1. **Penang**, an island of about 100 sq. miles, lying about 350 miles north-west of **Singapore**. Incorporated in government with **Penang** are **Province Wellesley**, a coast strip, 45 miles long, on the mainland opposite the island; and the **Dindings**, a small island and a small coast-strip 70 miles south of **Penang**.

FIG. 199.—STRAITS SETTLEMENTS, &c.



Emery Walker Ltd. sc.

2. **Malacca**, the largest of the Settlements, a coast region 240 miles north-west of **Singapore**.

3. The **Island of Singapore**, with an area of about 200 sq. miles, at the extremity of the peninsula.

Under the government of the **Straits Settlements** are also included the **Keeling or Cocos Islands**, to the south of **Sumatra**, and **Christmas Island**, south of **Java**.

The total area of the Settlements is about 1,600 sq. miles, and the population over 882,000.

The trade of the **Straits Settlements** is important, the two ports being **Singapore** and **Penang**, the former of which has about three times as much trade as the latter. The chief exports are tin, spices, and gums, the products of the peninsula; and the imports, rice and cotton goods for food and clothing.

The Settlements are a **Crown Colony**, under a Governor whose headquarters are at Singapore. Penang and Malacca have each a **Resident Councillor**.

The town of **Singapore** is one of the leading ports of the world, being situated at the gateway of commerce between the Indian and Pacific Oceans. The harbour is good, and there are no Custom duties; there is consequently a great interchange of commodities. The port is growing rapidly, and has a population of about 423,000.

STATES UNDER BRITISH PROTECTION.—The **Federated Malay States**.—These consist of—

1. **Perak** (pron. *Perá*), the most northerly, with an area of 7,800 sq. miles and a population of about 600,000.
2. **Selangor**, south of Perak; area 3,156 sq. miles, population about 400,000.
3. **Negri Sembilan** (the Nine States), south-east of Selangor; area 2,550 sq. miles, population about 180,000.
4. **Pahang**, on the eastern side of the peninsula; area 14,000 sq. miles, population about 146,000.

The State of **Johore**, at the south of the peninsula, opposite the island of Singapore, is under British control only with regard to its foreign affairs.

These States are being rapidly developed under British direction. **Tin** is extensively mined, and this is at present the chief industry, as the peninsula supplies the bulk of the world's tin. **Gold** is exported, and many other minerals are found and have still to be developed. **Coffee** and **rubber** are cultivated. The latter promises to be an important article of export, more land being planted every year.

Singapore is connected with the mainland by the Causeway of Johore, and the railway runs to Bangkok.

The chief towns are **Kuala Lumpur**, the thriving capital of Selangor, and **Taiping**, each connected with its port—the former with **Port Swettenham** and the latter with **Teluk Anson**.

SIAM.—Although independent of foreign control, and ruled by a king, European influence in Siam is considerable. Each State Department is assisted by a European adviser, many of whom are British.

The natural resources are being rapidly developed, and **rice**, **teak**, and **tin** are exported, the first named in very large quantities. The trade is carried on between Bangkok and Singapore, whence the goods are transhipped.

It is believed that parts of the country are rich in minerals, and steps are being taken to ascertain the extent of the mineral wealth.

Bangkok, the capital, has a population of about 900,000, many of whom live on the river. Only small vessels can ascend the Menam as far as Bangkok, hence the local trade with Singapore and Hong Kong. Further up the river stands **Ayuthia**, the old capital.

Bangkok is the terminus of several lines of railway, and a line to Singapore is being constructed.

FRENCH POSSESSIONS.—**Tongking** and **Cochin-China** are directly under French control; **Annam** and **Cambodia** are kingdoms under French suzerainty; the **Laos Territory** consists of three protected native States.

Railways and trade are being developed, and the rivers afford means of internal communication.

The chief exports are **rice** and **silk**. Fishing is carried on, and much **fish** is also exported.

TOWNS.—Hanoi, the capital of Tongking, has a population of about 150,000.

Hue, a port, is the capital of Annam; but Turan, further south, has a better harbour and is near a coalfield, so is likely to develop.

Saigon, a considerable port 34 miles from the mouth of the Mekong, is the capital of Cochin-China.

THE MALAY ARCHIPELAGO

SITUATION.—Between the great land-masses of Asia and Australia lie a vast number of islands, both great and small. If the sea-bed were to be elevated 100 fathoms these islands would be divided into two distinct regions differing greatly in their flora and fauna; New Guinea and the adjacent islands would be connected with Australia, while Sumatra, Java, Borneo, Celebes, and the Philippines would form part of Asia. The channel separating these two regions would pass between the **Islands of Bali and Lombok**, in the Sunda group, and through the **Molucca Passage**. The typical plants and animals of the islands lying to the east of this channel resemble those of Australia, while those of the islands to the west of the channel are similar to those of Indo-China. Hence all the islands lying west of this deep channel belong to the continent of Asia, and are known as the **Malay or Eastern Archipelago**.

SURFACE.—All the islands are mountainous and most of them volcanic. A chain of active volcanoes, some of which attain an elevation of 13,000 ft., extends through the Philippines, just touches the north-east of Celebes, and traverses the entire length of the Sunda Islands.

Many of the most destructive eruptions of modern times have occurred in these regions. That of **Krakatoa**, in the Sunda Strait, in 1883, was one of the most terrible eruptions on record.

CLIMATE.—The whole region lies within the Torrid Zone, and is subject to the influence of the monsoons. The climate is necessarily hot and moist; the mean annual temperature being over 80° F., while the mean annual rainfall exceeds 75 inches. The districts bordering the China Sea are subject to typhoons from May to November.

PRODUCTS.—The climatic conditions and the rich soil combine to produce a most luxuriant vegetation. Dense forests cover the mountain sides, and numerous food plants grow in abundance.

The principal vegetable products are rice, sugar, coffee, tobacco, indigo, cotton, spices, tea, cinchona, pepper, camphor, bananas, cocoa-nuts, ornamental timber, and gutta-percha.

The most important mineral product is tin, found in the **Islands of Banka and Billiton**. Coal is abundant in Sumatra and Borneo, and gold is also found in Borneo.

There is a great variety of animal life. Among the chief animals are the **tiger, leopard, rhinoceros, elephant, apes** (among which may be mentioned the **orang-utan** of Sumatra and Borneo), numerous **snakes**, and a great variety of birds.

ISLANDS AND TOWNS.—Most of the Malay Archipelago is now divided between **Holland, England, Portugal, and the United States**, Holland holding by far the most important part.

FIG. 200.—THE MALAY ARCHIPELAGO.



Longmans & Co, London & New York

1. The **Dutch** possess the Great Sunda Islands of **Sumatra, Java, Celebes**, the greater part of **Borneo**, the Lesser Sunda Islands, the **Moluccas**, and the western part of **Timor**.

2. The **United States** possesses the **Philippines** and the **Sulu Archipelago**.

3. **England** possesses north-western **Borneo** and **Labuan**.

4. **Portugal** possesses the eastern part of **Timor**.

Java.—This is the most important of the Dutch islands, and with the neighbouring island of **Madura**, has an area of 50,000 sq. miles, and a population of 30,000,000, exceeding England in density. The soil is rich and

highly cultivated; rice, sugar, tobacco, coffee, tea, and cinchona are the chief products. **Batavia** (150) is the capital, and the chief centre of commerce. **Surabaya** (156) and **Samarang** (96) are also important ports on the north coast.

Sumatra has an area of 160,000 sq. miles, and perhaps a population of 5,000,000. A range of high mountains extends along the west coast, with a plain towards the east. Coffee and tobacco are the chief products. The chief ports are **Padang** and **Benkulen**, on the west coast, and **Palembang**, on a navigable river on the east.

Borneo has a total area of 290,000 sq. miles. The Dutch claim an area of about 200,000 sq. miles. **Banjerassin** and **Pontianak** are the chief towns. The mountains rise to an elevation of 13,000 ft. in the north. The **Dyaks** are a barbarous native race. **Northern Borneo**, consisting of British North Borneo, Brunei, Sarawak, and the island of **Labuan**, having a total area of about 90,000 sq. miles, belongs to England. **Sago**, tobacco, coal, gold, and edible birds' nests, are important products.

Celebes has an area of 72,000 sq. miles. It produces coffee, cocoa, and sago. **Macassar** is the chief port.

The **Moluccas**, or **Spice Islands**, have an area of 30,000 sq. miles. **Cloves** from **Amboina**, **nutmegs** from the **Banda Islands**, and **cinnamon** are the chief products.

The **Philippines** and the adjacent islands embrace an area of 115,000 sq. miles, and a population estimated at 10,300,000. **Luzon** and **Mindanao** are the two largest islands. **Manilla** (285) is the capital and chief port. **Manilla hemp**, sugar, tobacco, cigars, and coffee are exported.

The **Philippines** were ceded by Spain to the United States in 1898.

PEOPLE AND RELIGION.—The **Malays** are the chief race on most of the islands. They are a brown-skinned race, with smooth straight hair, and are skilful fishermen and navigators. Formerly their piratical habits made them the terror of the peaceful traders of these seas. They were converted from Buddhism to **Muhammadanism** by the Arabs. In the interior of the larger islands many of the native tribes are in a barbarous condition. A considerable number of **Chinese** are engaged in mining, agriculture, and trade. **Papuans** inhabit many of the islands near New Guinea.

EXAMINATION PAPERS

- A. 1. What European nations have possessions in Indo-China? Mention the districts belonging to them.
2. Describe the coast-line from Rangoon to Hanoi, mentioning the chief points of interest.
3. Describe the water system of Indo-China. Why do the rivers flow in a southerly direction?
4. Why is the vegetation of the peninsula so luxuriant? Name the chief vegetable products.
- B. 1. What districts are noted for the following products:—Rice, tin, rubies, gutta-percha, teak, fish, indigo, and elephants?
2. Name the chief seaports of Indo-China. Give their situation and principal exports.
3. Where are the following:—Bhamo, Hanoi, Wellesley Province, Patkoi Mountains, river Sittaung, the Shan States, Tenasserim, Cambodia, and Ayuthia?
4. What points of resemblance are there between the Malay Archipelago and Indo-China?

- C. 1. Name the chief islands, with their situation and area.
2. What European nations have possessions in the Malay Archipelago? What do you know of the natives?
3. Give the chief products of Java, Sumatra, the Moluccas, Borneo, Bunka, Luzon, and Celebes.
4. Give the situation and facts concerning Batavia, the Sulu Sea, Timor, Benkulen, the Molucca Passage, Amboina, Labuan, Manilla, Sarawak, Krakatoa, and the island of Bali.

THE CHINESE EMPIRE

POSITION.—The whole of South-eastern Asia, with the exception of the Indo-Chinese Peninsula, is either under Chinese rule or subject to Chinese influence. Compared with the other great empires of the world, it ranks third with respect to area, and probably first with regard to population.

High mountain ranges, elevated and unproductive plateaux, and arid wastes effectually cut off China Proper from the other parts of Asia; hence the Chinese have remained apart from the rest of the civilised world, holding little or no intercourse with foreigners, and have developed a civilisation, manners, and customs peculiar to themselves.

AREA AND POPULATION.—The statistics with regard to the population of China are not very reliable, and vary considerably. According to recent authorities the estimated area and population of China and its dependencies are as follows:—Area: 4,277,000 sq. miles, and a population of about 325 millions.

RELIEF.—The greater part of the Chinese Empire consists of **plateaux**, crossed and bounded by **lofty mountain ranges**. The only large **lowland district** is the **Plain of Northern China**, extending from the Yang-tse-kiang (*kiang*, Chinese=river) to Peking, and, including the lower courses of the rivers Yang-tse-kiang, Hwang-ho, and Pei-ho, a remarkably fertile region and densely peopled. The **valleys** of the **Si-kiang** and of the **Sungari** are the only other important lowland districts.

PLATEAUX.—The great table-land of Tibet rises to an elevation of 15,000 ft. in its southern part. It is intersected by valleys and deep ravines, and from it mountain chains rise to a height of from 10 to 15,000 ft. above the surface of the plateau. Here also rise the great rivers of the Monsoon District. North of the Tibetan Plateau, the **Tarim Basin** falls to a level of not more than 1,600 ft. above the sea. The northern side of this basin is bounded by the mighty Tian-shan, which separates it from the **Dzungarian Depression**. The land again rises to about 7,000 ft. in the great **Mongolian Plateau**, which stretches eastward to the Amur. South of this plateau the great **Desert of Gobi** stretches almost uninterruptedly from the Pamir Plateau to the Khingan Mountains, and is probably not more than 3,000 ft. above the level of the sea. This depression is called by the Chinese, Han-hai or the Dry Sea.

MOUNTAINS.—The **Himalayas** form the southern boundary of the plateau of Tibet. On the north, the **Kuen-lun** extend from the Pamir eastwards quite into China Proper, and, as the **Fu-niu-shan Mountains** (*shan*, Chinese = mountain), separate Northern from Southern China. From the northern side of the Kuen-lun the **Altyn-tagh** and the **Nan-shan** are continued along the edge of the Mongolian Plateau as the **In-shan** and **Khingán Mountains**. South of the Yang-tse-kiang, lofty mountains, which may be regarded as eastwardly extensions of the Tibetan Plateau, occupy a great part of the country.

North of the **Tian-shan** the valleys of the Ili and Black Irtysh afford the readiest means of communication between Russia and China. The valleys of Northern China are filled with a rich yellow earth (loess) of great depth and remarkable fertility.

COAST-LINE.—The coast-line of China, excluding the minor indentations, extends to a length of 2,500 miles. The principal inlets have already been mentioned.

Of the islands, **Hainan**, with an area of 16,000 sq. miles, is mountainous and mostly inhabited by barbarous tribes. **Formosa** (Spanish = beautiful) is a fertile mountainous island, inhabited by independent Malay tribes on the east, and by Chinese on the west. Its area is about 15,000 sq. miles. After the war of 1894 this island was ceded to Japan. **Hong-kong**, a small island at the mouth of the Canton River, has belonged to England since 1841. It has now become a great centre of trade, with a population of 625,000, and is our most important naval and military station in the East. In 1898 **Kowloon**, an area of 400 sq. miles on the mainland to the north of Hong-kong, was leased to England for 99 years. **Victoria** is the capital of the island. **Macao**, situated at the western entrance of the same river, belongs to Portugal. Once commanding the monopoly of the Chinese trade, it has now greatly declined, the trade having gone either up the river to Canton, or across it to Hong-kong. In 1898 Great Britain acquired the fortified naval and coaling station of **Wei-hai-wei**, on the Shantung Peninsula.

CLIMATE.—Great extremes of heat and cold, together with general dryness, are the characteristic features of the climate of the great plateaux of the north and west. In China Proper the climate is much more even. In the north, warm summers are followed by cold winters; the Gulf of Pechili being frozen over in winter. Peking has a July temperature of 80°, while its January temperature is 20°, showing a range of temperature of 60°. As we go south the difference between summer and winter becomes much less, and in Southern China is not more than 20°.

The rainfall of China Proper is plentiful, the east coast having an annual average rainfall of 40 inches, decreasing from south to north. The China Sea is subject to destructive typhoons.

DRAINAGE.—On the plateaux the drainage is chiefly continental. Manchuria and China Proper are well watered, and drain into the Pacific Ocean.

1. **Inland Drainage.**—The **Tarim** is by far the most important river draining inland. It is fed by numerous streams from the Kuen-lun, **Tian-shan**, and **Karakoram Mountains**, and after draining the whole province

FIG. 201.—THE CHINESE EMPIRE.



of Chinese Turkestan, empties itself into the shallow **Lob Nur** (*Nur* = lake), which, like most of the Asiatic lakes, appears to be gradually drying up. The Tarim supplies the water for irrigating the crops of wheat, maize, &c., grown by the Tartar inhabitants. The Ili drains the Kulja Valley. Numerous lakes, mostly forming small systems of inland drainage, are scattered about the plateaux. **Tengri Nur**, in Tibet, and **Koko Nur**, at the foot of the Nan-shan Mountains, are among the chief.

2. **Oceanic Drainage.**—The Ob and Yenisei have their sources on the Mongolian Plateau. The Indus, Sanpo (upper course of the Brahmaputra), and the great rivers of Indo-China, have their origin in Tibet. The **Sungari**, a tributary of the Amur, drains Manchuria.

Most of China Proper is drained by four rivers—the **Yang-tse-kiang**, **Hwang-ho**, **Si-kiang**, and **Pei-ho**.

The **Yang-tse-kiang** rises in the Kuen-lun, bends in a southerly direction through Yunnan, and from thence, after an easterly course of about 3,000 miles, flows into the East China Sea. Its principal tributary is the **Han-kiang**, which joins the main stream at **Hankau**. The tide serves for 200 miles up the river, and steamers ascend to **Ichang**, a distance of 1,000 miles from the sea. Smaller vessels navigate the stream above the rapids for another 800 miles. Along its course are several large lakes which act as reservoirs in time of flood. The chief are **Tung-ting** and **Po-yang**.

The **Hwang-ho** (*ho*, Chinese = water) (2,600) rises close to the **Yang-tse-kiang**, makes a great bend northwards, diverging about 1,000 miles from that river, and after draining the north of the plain enters the Gulf of Pechili. The **Hwang-ho** is subject to most destructive alterations of its lower course, sometimes entering the sea to the north, and sometimes to the south of the Shan-tung Peninsula. The river has flowed through its present channel since 1890.

The **Si-kiang**, or Canton River, is navigable for 900 miles, and forms a large delta at its mouth.

The **Pei-ho** is formed by a number of streams, which once entered the Gulf of Pechili by separate mouths, but which now unite at Tientsin, and flow by a deep channel to the sea.

PRODUCTS.—**Vegetable.**—Trees are scarce on the whole; it is only in South-Eastern Tibet, Kulja, and on the slopes of the Tian-shan that extensive forests occur. **Medicinal rhubarb** is grown in great quantities in the upper basin of the **Hwang-ho**. **Ginseng**, the root of which furnishes a drug highly valued by the Chinese, is raised in Manchuria and Korea.

In China Proper great attention is paid to **agriculture**. The sides of the mountains are even cultivated in terraces. The yellow soil (loess) of the northern plain and the red soil of Yunnan and Sechwan are of remarkable fertility.

Wheat, barley, maize, millet, rice, sugar, opium, tea, and the mulberry are the most important cultivated products.

Animal.—China Proper is so densely peopled that wild animals are scarce. The **tiger** is found as far north as Mongolia, while in Tibet the antelope, yak, wild goat, sheep, musk deer, buffalo, and wolf are common.

Mineral.—China has vast stores of undeveloped mineral wealth. Her coal-fields are among the largest in the world, but are very little worked. There are also rich deposits of iron, copper, salt, and China clay.

Trade.—China has a very large coasting and river trade as well as foreign trade. A large part of her trade goes through Hong-kong, from which produce is distributed to the United Kingdom, the United States, Japan, France, British India, Germany, and other countries.

Exports.—Silk, raw and manufactured; tea, raw cotton, hides, skins, and furs.

Imports.—Cotton goods, opium, kerosene, metals, rice, sugar, coal and coke, woollen goods.

MEANS OF COMMUNICATION.—**Roads** are numerous, but are merely beaten tracks. The **rivers and canals** are the main means of communication. The **Grand Canal** extends from Hangchow to Tientsin, a distance of 700 miles. A large portion has been destroyed by the inundations of the Hwang-ho. The two principal routes between Russia and China are—
1. From Peking through Urga, the religious capital of Mongolia, to Maimachin. 2. From Hankau, on the Yang-tse-kiang, through the province of Kansu, where the desert narrows, and then north of the Tian-shan either by the valley of the Ili or the valley of the Irtysh.

Railways are being built, and about 6,000 miles are open for traffic.

TREATY PORTS.—For a long time after the discovery of the sea route to China foreign trade was confined to Canton (900) on the Si-kiang, but the right to trade at other ports along the coast has gradually been acquired, until at the present time more than forty ports are open to foreign vessels. These are known as **Treaty Ports**. Among the more important of these may be mentioned **Shanghai** (1,500), near the mouth of the Yang-tse-kiang, which far exceeds all the other ports in the amount of its exports and imports; **Chungking**, **Ichang**, **Hankau** (1,468), trading centres on the Yang-tse-kiang; **Tientsin** (800), on the Pei-ho, the port of Peking; **Swatau**, **Amoy**, **Fuchau** (320), **Ningpo**, and **Chifu**, on the coast; **Niuchwang**, in Manchuria.

TOWNS.—Of the inland towns, **Peking**, the capital, consists of two parts, a Manchu inner part, containing the Emperor's palace, temples, &c., and a Chinese outer part. It is situated in the densely peopled province of Pechili, and is said to have a population of over a million and a-half. **Nanking**, a former capital, on the Yang-tse-kiang, has suffered greatly from rebellions. **Singan**, an important town on a tributary of the Hwang-ho, **Chengtu**, in Se-chwan, and **Hangchow**, the starting-point of the Grand Canal, are towns of considerable importance.

2. **Manchuria** is part of the Chinese Empire. **Mukden** (160) is the capital.

3. **Tibet.**—The only town of importance is **Lhasa**, the capital. Although there are many passes over the Himálayas, there is but little trade. A British expedition in 1904 established friendly relations with the country.

4. **Mongolia** consists mostly of deserts, inhabited by nomadic Mongols. **Urga** is the capital, and **Maimachin** the chief trading centre.

5. **Eastern Turkestan.**—**Yarkand** and **Kashgar**, the two most important towns, are starting-places for the caravans crossing the Pamirs.

6. In **Dzungaria** the only important town is **Kulja**, the centre of an exceedingly fertile but thinly peopled district.

PEOPLE, RELIGION, AND GOVERNMENT.—The Chinese belong to the **Mongolian** type, of which they are the chief representatives. They are the most industrious of the Asiatic peoples, and are spreading into the neighbouring countries and islands. They are professedly **Buddhists** in religion. Worship of their ancestors is also almost universally followed, and the moral precepts of **Confucius** are held in high repute. The centre of Buddhism is in Tibet. The high priest, or Dalai Lama, resides at **Lhasa**. Another Lama resides at Urga, in Mongolia. Buddhist monasteries, many of them containing vast numbers of monks, are distributed all over Tibet. In the north-west—Dzungaria, Turkestan, and Yunnan—are about 30,000,000 **Muhammadans**.

The **language** of the Chinese is what is termed monosyllabic—that is, consisting of root-words, without inflections of any kind. Learning is held in great respect; all the Government posts are awarded on the results of competitive examinations.

The **government** is a Republic, and is composed of a President, Vice-President, Senate, and a House of Representatives.

Between Mongolia and China the **Great Wall** extends from the Gulf of Liaotong to the neighbourhood of Suchau, in Kansu, a distance of over 1,200 miles. It was built to protect the fertile provinces of China from the invasions of the marauding Tartars. It has not, however, always proved effectual, as the present dynasty is of Manchu race.

CHUSEN

This mountainous peninsula is situated between the Yellow Sea and the Sea of Japan. It has an area of 84,700 sq. miles, and a **population** estimated at 17,000,000. Formerly it was a dependency of China, but after the war between China and Japan in 1894 it was declared independent. In 1910 it became part of the Japanese Empire under the name of **Chusen**.

It is only in recent years that intercourse with Europeans has been allowed. At present the capital, **Seul**, and the three ports of **Chemulpo**, **Fusan**, and **Yuensan**, as well as six other ports, are open to foreign trade.

The chief **exports** are **ginseng** (a Government monopoly), which is exported to China, **beans**, **hides**, and **gold**. The chief **import** is **manufactured cotton** from England.

EXAMINATION PAPERS

- A. 1. Give the boundaries, and name the chief portions of the Chinese Empire.
2. Name the mountain ranges bordering the plateaux of Tibet and Mongolia.
3. Account for the extreme climate of Tibet and Mongolia.
4. Describe the two chief rivers of China.
- B. 1. Where are the Fu-niu-shan, Altyn-tagh, and Tian-shan Mountains, the Pei-ho, Han-kiang, and Sanpu Rivers?
2. Why is China Proper so densely peopled?
3. What are the chief vegetable products of China? Which of these are exported?
4. Describe the people and government of the Chinese Empire.
- C. 1. Give the situation of the principal 'treaty ports.'
2. Describe Tibet.
3. Where are the following situated: - Nanking, Yunnan, Shantung, Hainan, Singan, Yarkand, Kulja, Urga, Hangchau, and Seul?
4. What effect has the situation of China had upon the character of the people?

THE JAPANESE EMPIRE

GENERAL DESCRIPTION.—Japan, or Nippon, as the Japanese term it, is an island empire, commencing from the

FIG. 202.—JAPAN.



peninsula of Kamchatka in the north, and extending as far as and including Formosa in the south. It comprises—

1. The **Kurile Islands**, stretching across the entrance to the Sea of Okhotsk.
2. The southern half of the island of **Sakhalin**, ceded by the treaty of 1905.
3. The group of islands lying to the east of and enclosing the Japan Sea, and comprising the four large islands of **Hokkaidô** (**Yezo**), 36,000 sq. miles; **Honshiu**, 87,000 sq. miles; **Kiushiu**, and **Shikoku**.
4. The **Riu-kiu** (**Lu-chu**) Islands, enclosing the Yellow Sea.
5. **Formosa**, 13,500 sq. miles, acquired by Japan from China in 1895.
6. **Chusen**, annexed to Japan in 1910.

The Japanese Empire thus stretches over about **28 degrees of latitude**, or nearly 2,000 miles, and has an **area** (including Chusen) of about 260,500 sq. miles. The **population** is about 56,000,000, most of whom inhabit the islands of Honshiu (Hondo), Kiushiu, and Shikoku. Hokkaidô is inhabited by a scanty coast population, chiefly engaged in fishing.

RELIEF.—The islands are very **mountainous**, the principal peaks are **volcanoes**, over fifty of which are active. **Fujiyama** (12,400 ft.) is the highest peak. **Aso-san**, in Kiushiu, is, however, the largest volcano; its crater is said to be twelve miles in diameter. Earthquakes, although of frequent occurrence, are not usually very destructive. This is probably due to the activity of the volcanoes.

COAST-LINE.—Like Great Britain, the coast-line is extensive, with numerous small openings, thus affording great facilities for commerce. The chief **straits** are:—**La Pérouse Strait**, between Sakhalin and Hokkaidô; **Tsugaru Strait** (Sangar), between Hokkaidô and Honshiu; **Korea Strait**, separating Korea from Japan; and **Formosa Strait**, between Formosa and China.

CLIMATE.—The islands, with the exception of Formosa, lie within the Temperate Zone, and, the eastern shores being washed by the warm Japan current (Kuro Siwa) from the equatorial regions, the climate is much more equable than that of the adjacent mainland. The western side of Honshiu is much colder than the eastern, and Hokkaidô has exceedingly severe winters, although in about the same latitude as Northern Italy. The **rainfall** is abundant; at Tokio the mean annual fall is about 65 inches.

RIVERS.—The character of the surface prevents the rivers being of much use for navigation, and so much sediment is brought down by them that the harbours at their mouths are choked up. The **Shinano**, 180 miles, flowing into the Japan Sea,

is the longest. **Lake Biwa** is a fine sheet of fresh water 45 miles in length, situated in the south of Honshiu, in the midst of magnificent scenery.

VEGETABLE PRODUCTS.—The abundant rains, the warm summers, and the fertile soil of the valleys cause the vegetation of Japan to be exceedingly rich. The mountains are covered with forests; **conifers**, especially cedars and pines, growing to a great height. The most valuable trees are the **camphor tree**, which has a trunk of great size, the **gum-varnish tree**, the **mulberry tree** for the silkworm culture, and the **bamboo**, which is utilised by the Japanese for a great variety of purposes. Although so much of the surface is mountainous, the cultivable land is so skilfully and carefully tilled that a dense population is supported. **Rice** is the most important crop; **wheat**, **barley**, and **millet** are also extensively grown. Of the other products, **tea**, **silk**, **cotton**, and **tobacco** are the most important.

MINERALS.—Japan is rich in minerals. The production of coal is rapidly increasing; **iron**, **copper** of excellent quality, **antimony**, **silver**, **sulphur**, **gold**, and **kaolin** (for porcelain) are also found.

MANUFACTURES.—Japan is making great strides in manufacture, the Government encouraging the establishment of machine industries. There are large **steel works**, **cotton** and **silk** goods are manufactured, and the existence of timber and sulphur has led to an important industry in **matches**. **Bronze-work**, **porcelain**, and **lacquer-work** are renowned.

EXPORTS.—The chief exports are **silk**, **tea**, **rice**, **coal**, **porcelain**, **lacquered ware**, and **camphor**.

IMPORTS.—The chief imports are **cotton** and **woollen goods**, **sugar**, **petroleum**, **machinery**, and **ships**.

TOWNS.—The capital is **Tokio** (2,186), a city of vast extent, situated on the largest plain in Honshiu. It manufactures bronzes and lacquered ware, and is a treaty port. **Yokohama** (394) and **Kanagawa** are also treaty ports on the same bay. The former is the most important seat of European trade. **Kioto** (591), the ancient capital, is the chief centre of learning, art, and religion in Japan, and manufactures bronzes and porcelain. **Osaka** (1,252) and **Kobe** are both important treaty ports. **Nagasaki**, a treaty port on the island of Kiusiu, has a splendid natural harbour, with a coalfield close at hand. **Niigata** is the only treaty port on the north coast of Honshiu. **Hakodate** is the chief treaty port of Hokkaidô.

PEOPLE AND GOVERNMENT.—The people belong to the **Mongol** race, and are mostly **Buddhists** in religion. They are brave, lively, courteous, and quick in acquiring knowledge. Like the Chinese, they showed the same jealousy of foreign intercourse and had attained a high degree of civilisation before coming into contact with Europeans. In recent years a remarkable change has taken place. Universities, colleges, and schools have been established, railways have been constructed, factories and ship-building yards have been built, and many Japanese youths have been sent to foreign countries to extend their education.

The ruler of the Japanese is called the **Mikado**, and recently a constitutional form of government, similar to that of European countries, has taken the place of the old despotic system.

The earlier race, the **Ainos**, are now mainly confined to the Island of **Hokkaidô** and the Kuriles, and are chiefly hunters and fishermen.

EXAMINATION PAPERS

- A. 1. Name the principal islands forming the Empire of Japan, with their situation.
2. Describe the surface and vegetation of Japan.
3. What is the effect of the Kuro Siwa upon the climate? Why has Hokkaidô so severe a winter?
4. What are the channels leading into the Japan Sea, and what do they separate?
- B. 1. Describe the people of Japan. What remarkable changes have taken place of late years?
2. For what industries are the Japanese especially famous?
3. Give the situation of Tokio, Nagasaki, Hakodate, Yokohama, Niigata, and Kobe.
4. What are the following noted for : —Osaka, Kioto, Aso-san, Fujiyama. Satsuma, and Lake Biwa?

AFRICA

POSITION AND BOUNDARIES.—By far the greater portion of Africa is situated within the Torrid Zone. The Equator crosses the continent nearly midway between its northern and southern extremities. In outline and compactness of form it somewhat resembles Australia and South America. It is separated from Europe by the Mediterranean Sea, and from Asia by the long and narrow Red Sea. The Atlantic Ocean washes its western shores, while the Indian Ocean bounds it on the east.

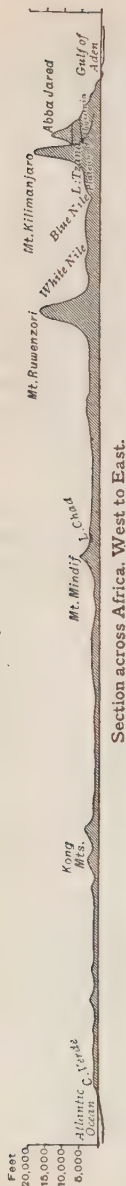
SIZE.—Africa is about three times as large as Europe, and has a total area of about 11,500,000 sq. miles. Its **greatest length** is 5,000 miles from Cape Blanco, $37^{\circ} 28' N.$, to Cape Agulhas, $34^{\circ} 49' S.$ Its **greatest width** is 4,600 miles, from Cape Verde, $17^{\circ} 32' W.$, to Cape Gardafui, $51^{\circ} 16' E.$

RELIEF.—The greater part of Africa consists of moderately elevated plateaux bordered near the coast by chains of mountains, leaving a comparatively narrow strip of lowland near the sea. Most of Northern Africa is occupied by the great **Sahara Desert**, covering an area of 2,500,000 sq. miles, stretching from the Atlantic to the Red Sea, and sloping somewhat towards the west. This vast arid waste forms a natural barrier between the Mediterranean States and the Sudan, and but for the camel would be impassable to man. Towards the Equator the land becomes more elevated, the temperature is higher, the rainfall abundant, the country is covered with a luxuriant vegetation, and supports a great population. To the south-west of the tropical belt the rainfall again decreases, and the great **Kalahari Desert** stretches northwards from the Orange River for about 1,000 miles.

MOUNTAINS.—Like Australia, the mountains of Africa lie near the coast. There are three main systems: the **East Coast Range**, the **West Coast Range**, and the **Atlas System** in the north.

1. **The East Coast Range.**—In the south of Africa the land rises northward from the sea in three terraces, each bordered by ranges of mountains, the third of which, the **Nieuwveld**, 8,000 ft., is the true mountain-chain. This chain is continued north to the

FIG. 203.



Section across Africa. West to East.

Limpopo as the **Quathlamba**, or **Drakenberg Mountains**, 10,000 ft. The range is not now so continuous, but as we approach the Equator the highest mountains of the continent are found—the snow-clad peaks of **Kilimanjaro**, 20,000 ft., and **Kenia**, 18,500 ft. Further northwards, from the **Abyssinian Plateau**, the peak of **Ras Dashan** attains a height of over 15,000 ft. From Abyssinia the range is continued by the shores of the Red Sea to the neighbourhood of Cairo.

2. The **West Coast Range** also has its origin in the south, and extends northwards to the Gambia. North of the Congo the lofty **Cameroon Mountains** rise to a height of 13,700 ft. The neighbouring island of **Fernando Po**, which may be regarded as a part of the range, reaches an altitude of 11,000 ft. Between the Niger and the Gambia the chain is more continuous, but the elevation does not exceed 3,000 ft. On the border of the Sahara the range disappears, and the sands from the desert are blown out to sea, forming extensive shoals.

3. The **Atlas System** includes the mountains of Morocco and Algeria. **Jebel Miltzin**, 11,400 ft., is the highest summit. In Algeria there are two ranges, the **Little Atlas** near the coast and the **Great Atlas** further south. On the table-land between the two ranges are a number of brackish lakes or marshes known as **Shotts**. The volcanic peak of **Teneriffe**, 12,200 ft. in height, is situated in the Canaries to the West.

COAST-LINE.—The coast-line of Africa is comparatively unbroken. No large inlets penetrate into the land as in the case of Europe; hence there are fewer facilities for communication with the interior.

Europe has 1 mile of coast to 190 sq. miles of surface; Asia has 1 mile of coast to 500 sq. miles of surface; while Africa, with a coast-line of 16,000 miles, has but 1 mile of coast to 700 sq. miles of surface.

There are but two extensive bays in the coast—one in the north, forming the **Gulfs of Cades** and **Sidra**; and one in the west, the **Gulf of Guinea**, which contains the **Bights of Benin** and **Biafra**. The **Mozambique Channel**, 230 miles in width, parts the island of Madagascar from the mainland.

The principal capes on the north are: **Capes Bon** and **Blanco** in Tunis, and **Cape Spartel** on the Strait of Gibraltar. On the west: **Cape Cantin** in Morocco, **Cape**

Blanco on the Sahara coast, **Cape Verde** in Senegal, **Cape Palmas** and **Cape Three Points** in Guinea, **Cape Formosa** at the mouth of the Niger, **Cape Lopez** and **Cape Frio** to the south of the Equator. On the south: **The Cape of Good Hope** and **Cape Agulhas**. On the east: **Cape Corrientes**, **Cape Delgado**, and **Cape Gardafui**. On the island of Madagascar: **Cape Amber** and **Cape St. Mary**.

FIG. 204.—AFRICA: RELIEF.



ISLANDS.—Africa has but few islands. On the north-west are the **Azores**, **Madeira Islands**, **Canary Islands**, and **Cape Verde Islands**. In the Gulf of Guinea the mountainous islands of **Fernando Po** and **St. Thomas**. Out in the Atlantic, **St. Helena** and **Ascension**. On the east, the great island of **Madagascar** has an area of 228,000 sq. miles. Further east are the islands of **Mauritius** and **Bourbon**; while to the north are the **Comoro Islands** and the **Seychelles**. Opposite to Cape Gardafui is the rocky island of **Socotra**.

CLIMATE AND RAINFALL.—The situation of Africa causes the climate to be hot. Compared with the other continents, there

annual temperature of 80°. The African seasons are determined not so much by the degree of heat as by the amount of the rainfall, dry seasons and rainy seasons following each other with great regularity.

Africa may be broadly divided into five regions, according to the rainfall:—

1. **The Tropical Belt.**—Here the rainy season follows the course of the sun; thus, when the sun shines vertically north of the Equator it is the rainy season for the Sudan, while the Zambesi Valley has its rainy season when the sun's rays are vertical south of the Equator.

This is due to the fact that the land heated by the sun causes an indraught from the sea. The **south-east trade winds** from the Indian Ocean discharge their moisture on the mountains of Eastern and Central Africa, while the Guinea Coast is drenched with rain brought by the winds blowing from the Gulf of Guinea.

2. **The Sahara**, where little or no rain falls.

The winds from the Indian Ocean and the Gulf of Guinea part with their moisture before reaching this district, while the **north-east trade winds**, which prevail in these latitudes, are land winds, and consequently dry.

3. **The Kalahari district**, in the south-west.

The mountains of the east coast deprive the south-east winds of their rain before they reach this district.

4. **The Atlas region**, in the north, has rain during our winter, when the midday sun is overhead south of the Equator.

5. **The South-west of the Province of the Cape of Good Hope** has rain during our summer, when the midday sun is overhead north of the Equator.

Within the tropics the great mass of land becomes heated by the sun's rays, and a great indraught towards the land is caused. The south-east trade wind, charged with moisture from the Indian Ocean, discharges its contents on the mountains of the east coast and the interior, supplying the magnificent lakes and the great rivers which originate in this district. On the west side the winds are deflected towards the land from the Gulf of Guinea, and supply the waters for the mighty Niger. Before reaching the Sahara these winds are robbed of their moisture, and the north-east trade winds, blowing from the land, bring no rain to this district. In the north the prevailing westerly winds, from the Atlantic, part with their moisture on the mountains of Morocco and Algeria; while in the south the winds from the Indian Ocean discharge their contents on the coast mountains before reaching the Kalahari Desert.

DRAINAGE.—The drainage of the continent corresponds to the rainfall belts. The tropical belt is drained by four large rivers, all of which have their navigation obstructed by rapids, and which do not therefore afford direct communication with the interior.

1. **The Nile** (4,000).—The head-waters of the Nile flow into **Lake Victoria Nyanza**, the largest lake in Africa, probably equalling Lake Superior in area. It flows from the lake in a northerly direction, and receives the waters of **Lakes Albert Nyanza** and **Albert Edward Nyanza**. Its chief tributaries are the **Bahr-el-Ghazal** from the Sudan, the **Bahr-el-Azrek** (Blue Nile), which drains **Lake Dembea**, and the **Atbara**, from the Abyssinian Plateau. From its confluence with the Atbara to the sea, a distance of 1,400 miles,

FIG. 207.—AFRICA: RAINFALL, DECEMBER TO FEBRUARY:
WINTER IN N. HEMISPHERE.



Emery Walker sc.

after Supan

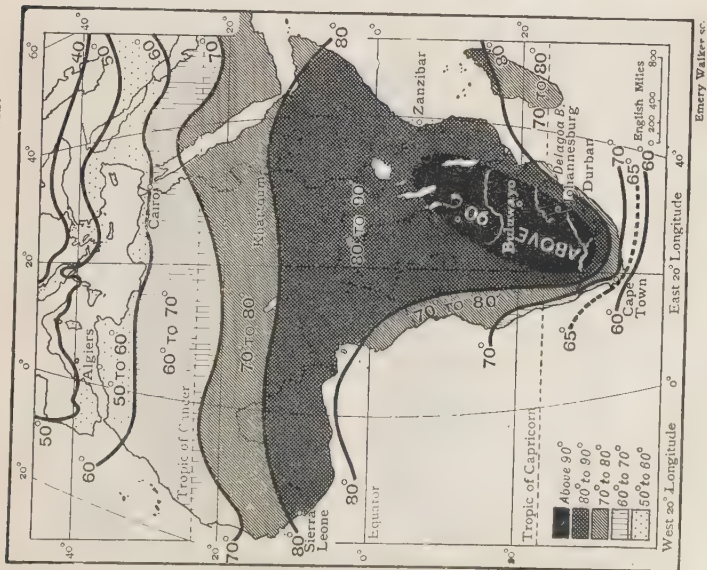
FIG. 206 —AFRICA: RAINFALL, JUNE TO AUGUST:
SUMMER IN N. HEMISPHERE.



Emery Walker sc.

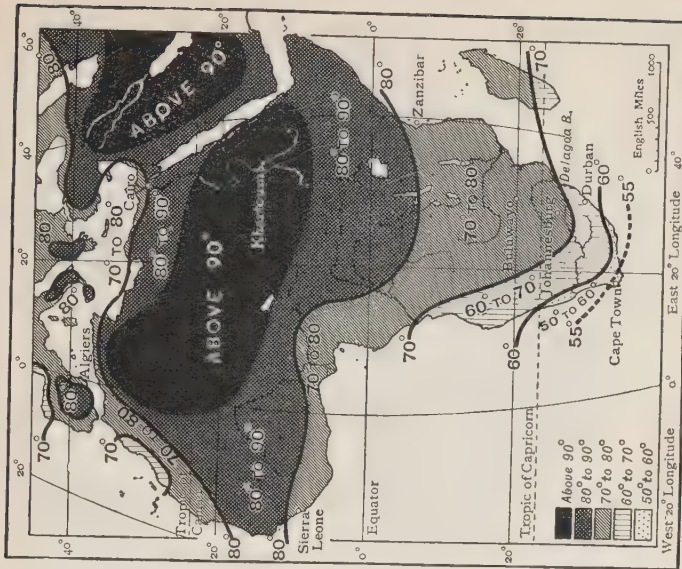
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FIG. 208.—AFRICA: JANUARY ISOTHERMS.



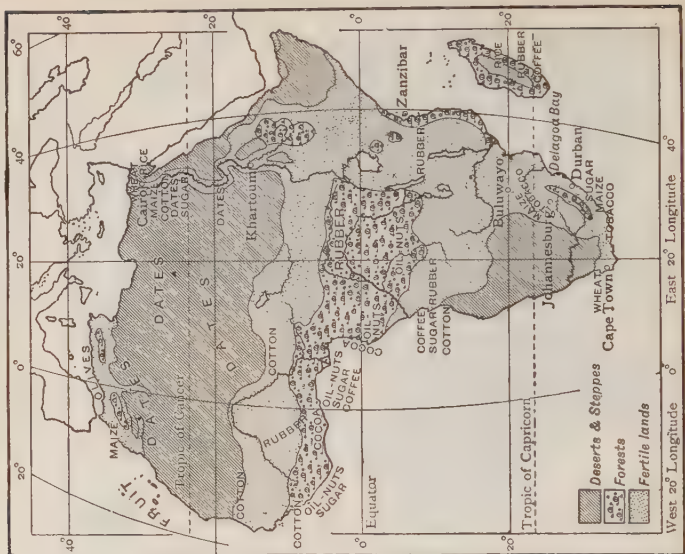
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FIG. 209.—AFRICA: JULY ISOTHERMS.



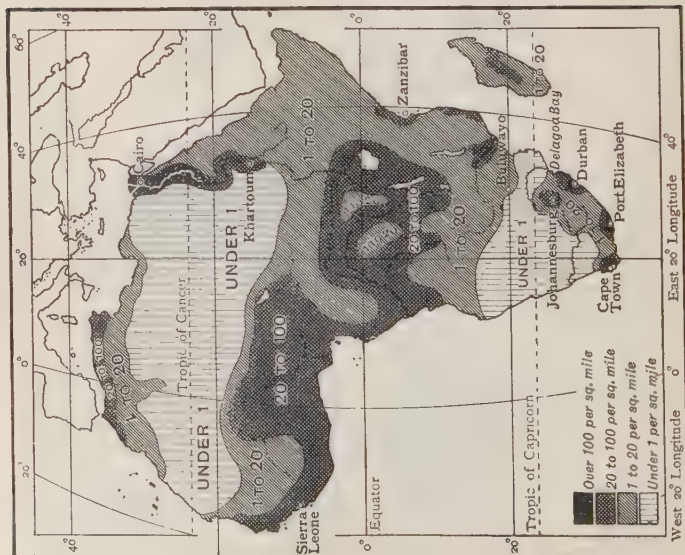
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FIG. 211.—AFRICA: VEGETABLE PRODUCTS.



Emery Walker 35

FIG. 210.—AFRICA: DENSITY OF POPULATION.



Emery Walker 35

it does not receive a single tributary. Its delta begins about 85 miles from the Mediterranean, from which it affords direct communication to its first cataract, a distance of nearly 800 miles.

2. The **Niger** (2,300) rises not far from the coast, makes a great curve to the north, and enters the gulf of Guinea at a point not far south of its source. Its chief tributary is the **Benue** from the east.

3. The **Congo** (3,000), although not the longest of the African rivers, exceeds them all in volume of water. It rises to the west of Lake Nyassa, and, as the **Chambezi**, enters **Lake Bangweolo**; from thence it passes through **Lake Moero**, and probably receives the overflow of **Lake Tanganyika**, a narrow lake over 400 miles in length. It flows past **Nyangwe** to **Stanley Falls**, near the Equator; from here to **Stanley Pool** it is a broad, deep, navigable stream for 1,000 miles. In passing through the **West Coast Mountains** rapids are formed, which prevent direct communication from the sea. Among its numerous tributaries are the **Kassai** on the left and the **Mobangi** on the right bank.

4. The **Zambesi** rises in **Lake Dilolo**, and flows south to its junction with the **Chobe**. After receiving this affluent the river is precipitated into a rocky chasm forming the magnificent **Victoria Falls**. Before reaching the sea it receives the **Shire** from the north, which drains **Lake Nyassa**, a long narrow lake 350 miles in length.

Of the smaller rivers draining the tropical belt the chief are the **Senegal** (900), **Gambia**, and **Rio Grande**, in **Senegambia**; the **Volta**, on the **Gold Coast**; the **Ogowe** to the north and the **Kwanza** to the south of the **Congo**; the **Limpopo** (1,300), the **Rovuma**, **Rufiji**, and **Juba**, flowing into the **Indian Ocean**.

The rivers draining the north and south of the continent are mostly short, and contain little or no water during the dry season. The **Orange River** (1,100), in the south, is the only large stream.

Inland Drainage.—There are two areas of inland drainage: one north of the Equator, where **Lake Chad**, a large, shallow, fresh-water lake, receives the **Shari** and other streams; and one in the south, where **Lake Ngami** receives a considerable drainage during the wet season. Both lakes decrease greatly in size during the dry season, and both abound in fish.

MINERALS.—**Gold** is the most valuable mineral of Africa. It is widely distributed throughout the **Sudan**, and the **Guinea** and **Zanzibar** coasts; but the richest field is that of the **Transvaal**, which produces annually gold to the value of over 30 million pounds. **Copper** is found in many parts. **Katanga**, to the west of **Lake Tanganyika**, furnishes large supplies; while the mine of **Ookiep**, in the **Cape Province**, produces the richest ore in the world. **Salt** abounds in the desert districts, especially in the west of the **Sahara**. **Diamonds** are found in the **Kimberley** mine and in the **Premier** mine in greater quantities than in any other part of the world. **Silver**, **iron**, and **lead** are widely diffused.

VEGETATION.—In no continent can the relation between climate and vegetation be more closely traced than in **Africa**, the continent being divided into broad belts with characteristic species.

1. **The Equatorial Forest Belt.**—The characteristic trees of this belt are the giant **baobab**, **ebony**, **camphor**, **gum**, and many hard and ornamental woods. The **rubber tree** has given rise to a thriving industry.

2. **Savanna Belts.**—Proceeding outwards from the Equator, dense forests give place to rolling plains with good timber trees, along the courses of the rivers.

3. **Steppe-like Belts.**—These lie between the savannas and the deserts. The thorny **acacia** is the most characteristic tree, and **tropical plants** flourish wherever cultivated. The **bamboo** is found in this belt.

4. **Desert Belts.**—These lie on the tropical belts of calms, which partly accounts for their desert nature (see also page 420). Stunted acacias find a precarious existence, and groves of palms occur on the oases.

FIG. 212.—AFRICA: POLITICAL.



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5. **The Temperate Belts.**—Along the north of the continent the vegetation is similar to that of Southern Europe; in the South Temperate Belt the vegetation is characterised by brilliant flowering plants and the comparative absence of trees.

Except in the desert areas, vegetation in Africa is remarkably luxuriant. The natives find food without much cultivation, and this accounts to some extent for their want of civilisation. The chief food-plants are **cassava**, **yam**, **ground-nut**, **banana**, **tamarind**, **cocoa-nut**, **pine-apple**, and among cultivated plants are **durrah**, **maize**, **cotton**, and **sugar-cane**.

ANIMALS.—The grassy plains support vast numbers of antelopes, zebras, quaggas, &c., which are preyed upon by lions, leopards, and hyenas. The tall giraffe is found among the clumps of trees, the elephant and rhinoceros in the forests of the centre and south, while the hippopotamus inhabits the rivers and lakes of the tropical region. Monkeys, baboons, and apes inhabit the forests throughout the continent; the chimpanzee and the gorilla are found chiefly in the districts around the Gulf of Guinea. Crocodiles abound in the rivers, and numerous snakes, of which the python is the largest, are found all over the continent.

The ostrich inhabits the deserts of the north and south, and numerous species of vultures act as scavengers.

Among the insects, the locusts of the north and south and the termites, or white ants, of the south are the most destructive.

PEOPLE.—Africa is inhabited by two stocks—the **Caucasic** and the **Negro**.

1. The **Caucasic** stock inhabits the north and north-eastern parts of the continent, and originally came from Asia. There are two great branches—the **Semitic**, inhabiting the northern coast districts, of whom the **Arabs** are the chief type; and the **Hamitic**, chiefly inhabiting the Sahara and the north-east, of whom the **Berbers**, **Egyptians**, **Somali**, and **Gallas** are representative types. Southern Africa is also settled by members of the **Aryan** race. **Arabs** are widely distributed as traders in Eastern and Central Africa.

2. The **Negro** stock inhabits Africa south of the Sahara. The stock may be divided into four main branches—the true **Negroes** and **Fulahs**, inhabiting the districts to the south-west of the Sahara; the **Bantus**, occupying the country to the south; and the **Hottentots**, who dwell in the south-west corner of the continent.

The population is vaguely estimated at 200,000,000, about 18 to the sq. mile.

THE COUNTRIES IN AFRICA, WITH THEIR CAPITALS.

Country	Capital
Egypt	Cairo
Egyptian Sudan	Khartum
French Equatorial Africa	—
Tripoli	Tripoli
Algeria	Algiers
Tunis	Tunis
Morocco	Fez
West Coast Settlements	Freetown
Northern Nigeria	Zungeru
Southern Nigeria	Lagos
Belgian Congo	Leopoldville
Portuguese West Africa	Loanda
Portuguese East Africa	Mozambique

Cape of Good Hope	forming the Union of South Africa	Cape Town
Natal		Pietermaritzburg
Orange Free State		Bloemfontein
The Transvaal		Pretoria
South-West Africa		Windhuk
Rhodesia		Salisbury
Bechuanaland Protectorate		—
Nyasaland Protectorate		Zomba
The Kenya Colony, Tanganyika Territory (formerly German East Africa)		Nairobi
Abyssinia		—
Congo		—
Madagascar		Antananarivo

EXAMINATION PAPERS

- A. 1. Why may Africa be called the Equatorial continent? State its chief dimensions.
 2. Give the characteristic features of the surface of Africa.
 3. How many great mountain systems are there? Trace the East Coast Range.
 4. How does the land rise from the sea in South Africa?
- B. 1. Compare the coast-line of Africa with that of Australia.
 2. Give the situation of the chief islands and capes.
 3. Where are the following:—Jebel Mitsin, Mount Kenia, Teneriffe, Cameroon Mountains, the Little Atlas, Cape Corrientes, Mozambique Channel, and Cape Amber?
 4. Give facts to prove that the climate of Africa is more uniform than that of the other continents.
- C. 1. Explain why the Sahara is comparatively rainless.
 2. How does the sun affect the rainfall of Africa?
 3. Account for the fact that the Congo brings more water to the sea than the Nile.
 4. What is the effect of the Drakenberg Mountains upon the climate of South Africa?
- D. 1. Trace the courses of the Nile and Congo.
 2. Name the chief lakes of Africa, and say what rivers are connected with them.
 3. Describe the rivers flowing into the Indian Ocean.
 4. What are the typical plants of Equatorial Africa, the Sahara, and South Africa?
- E. 1. What districts are noted for gold, diamonds, copper, ostriches, termites, elephants, and hippopotami?
 2. Describe the people of Africa.
 3. Which parts of Africa are most thickly peopled, and what races inhabit those districts?
 4. What parts of Africa are most suitable for the home of white men, and why?
- F. 1. In the map showing January isotherms it may be seen that the isotherm of 80° has a range on the west coast from north of the Equator to Cape Colony. Explain the causes of this great range.
 2. What are the causes of the great heat of Northern Africa in July?
 3. Cotton requires a fertile soil and a damp heat. What parts of Africa are most suitable for its growth?
 4. Show how the rainfall affects the volume of water brought down by the Nile and the Congo.

NORTHERN AFRICA

EXTENT, PEOPLE, &c.—Northern Africa embraces the regions lying between the Mediterranean and the Sahara, comprising the four **Barbary States** (Morocco, Algeria, Tunis, Tripoli) and **Egypt**.

The **people** are chiefly **Muhammadans** in religion, and belong mainly to three races: 1. The **Berbers** (hence the name Barbary), who are mostly settled and engaged in agriculture. 2. The **Arabs**, who in **Egypt** are chiefly settled as cultivators of the soil (fellahin), but in the other States are mainly nomadic and engaged in pastoral pursuits. 3. The **Moors**, a mixed race, chiefly engaged in trade and commerce, and inhabiting the towns.

The **Copts** of **Egypt** are an ancient Christian sect, and large numbers of **Jews** are scattered throughout the towns of Northern Africa.

Recent estimates of the **area** and **population** are as follows:

1. Morocco	.	.	.	.	230,000 sq. miles,	6,000,000 inhabitants.
2. Algeria	.	.	.	.	220,000	5,800,000
3. Tunis	.	.	.	.	50,000	2,000,000
4. Tripoli	.	.	.	.	400,000	560,000
5. Egypt , excluding the Sudan					400,000	12,700,000

1. **MOROCCO**.—The surface is exceedingly mountainous. The portion of the Atlas system known as the **High Atlas** extends in a north-easterly direction from **Cape Ghir** to the Mediterranean, descending to the lowlands in terraces. It is on the coast side of the range that the fertile land of the country is situated, the mountains arresting the moisture brought by the north-west winds from the Atlantic, and it is here that most of the inhabitants are to be found. On the other side of the range the country is sterile, the population scanty, and the rainfall gradually diminishes until, at the **Oasis of Tuat**, rain falls only at intervals of several years. There are no large rivers, and only those rising on the north-west of the Atlas flow throughout the year. Those of the south are dry channels for most of the year. The **Wady Draa**, in the south, only reaches the sea after the melting of the snows.

PRODUCTS.—**Forests** clothe the slopes of the mountains, and **fruits** grow in abundance; the **dates** of the oasis of Taflet are especially noted. Rich deposits of **iron**, **lead**, and **copper** exist, but are not worked. The **camel** is the most useful animal.

The principal **exports** are **maize**, **wool**, **oil**, **leather**, and **fez-caps**. The most important trade is the caravan traffic with the **Sudan**, where European goods are bartered for **gold-dust**, **ostrich-feathers**, **gums**, and **slaves**.

The **government** is an absolute despotism, the **Sultan** being the head of the State and the head of the religion.

TOWNS.—The principal inland towns are **Morocco** (50), on the river Tensift; **Fez** (170), on the river Sibus, noted for the manufacture of leather, and the red-cloth caps worn so extensively in Muhammadan countries; and **Mekinez**.

The only port of importance is **Tangier**, at the entrance of the Strait of Gibraltar. **Mogador** and **Rabat** are ports on the Atlantic coast. Spain possesses the towns of **Ceuta**, **Tetuan**, and **Melilla**, on the Mediterranean.

2. ALGERIA AND TUNIS.—Algeria has been a **French colony** since 1830. Tunis has a native ruler, called the **Bey**, but has been under French protection since 1881.

SURFACE.—The surface of Algeria may be divided into three regions:

1. The **Tell**, a fertile strip of cultivated land extending from the coast to the **Little Atlas**.

2. The upland region of plateaux, ascending in steps to the **Great Atlas** and falling in terraces to the Sahara. Here vegetation is scanty, and cultivation is only possible where irrigation is carried on. The French have sunk **Artesian wells** for this purpose with great success. The coarse **alfa-grass**, used in the manufacture of paper, covers vast areas of this region.

3. The **Algerian Sahara**.—Here the only habitable districts are the oases, where natural springs or Artesian wells furnish water for the dates and pastures of the Bedouins.

In Tunis the most fertile district is the valley of the **Mejerda**. Stretching westwards from the Gulf of Cabes, and only separated from it by a strip of land ten miles in width, is a tract of land lying below the sea-level, and occupied by shallow salt lakes called **shotts**. These shotts also occupy numerous depressions on the plateau.

RIVERS.—The two largest rivers are the **Shelif**, in Algeria, and the **Mejerda**, in Tunis. The latter river overflows its banks during the winter rains, and is much used for irrigation.

PRODUCTS.—Since the French occupation good roads, railways, and Artesian wells have done much to develop the resources of the country; unhealthy districts have been drained, large areas planted with trees—especially with the blue-gum (eucalyptus) of Australia, the leaves and fruit of which possess such valuable medicinal properties—and the Berbers, here known as Kabyles, have been induced to adopt a settled life. The principal exports are wine, sheep, wool, early potatoes, alfa-grass, olives, iron-ore from the neighbourhood of Bona, coral, and sponges.

TOWNS.—The capital, **Algiers** (206), has a beautiful situation on rising ground. The old portion has narrow, winding, and dirty streets; the new is laid out like a European town. It is connected by railways with most of the principal towns. **Oran** (141), **Bougie**, **Philippeville**, and **Bona** are the chief ports. **Constantine** (78), the principal town in the interior, is a strong fortress.

Tunis, the capital of the State, manufactures silk and woollen stuffs, leather, earthenware, soap, and olive oil, and is estimated to contain a population of 171,000 inhabitants. **Goletta** is the port of Tunis; near by

are the ruins of the ancient city of Carthage. **Kairwan** (50), farther to the south, is regarded as one of the sacred cities of the Muhammadans. **Susa**, **Sfax**, and **Cabes** are the principal ports.

FIG. 213.—THE NILE VALLEY.



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3. **TRIPOLI.**—This State, which covers a vast area, has but a small coast strip of cultivated land towards the east, the desert

reaching the shores of the Mediterranean in places. It is an Italian province (1911), and includes the district of Fezzan, a collection of oases, through which the caravans pass to the Sudan, a journey occupying about three months.

Tripoli (73) is the only seaport, and is the starting-point for the caravan trade across the Sahara. **Bengazi** is the port of **Barka**.

The principal exports are alfa-grass, ostrich feathers, and sponges.

4. EGYPT.—BOUNDARIES.—**Egypt Proper** extends from the **Mediterranean** on the north to a line drawn east and west through **Wady Halfa** on the south. The **Red Sea** and a line drawn from the head of the Gulf of **Akabah** to the **Mediterranean** form its eastern boundaries; while on the west the boundary is an indefinite line drawn through the **Libyan Desert**.

Of the total area of 400,000 sq. miles (excluding the Sudan), the only habitable parts are the **Nile Valley**, the **Delta**, and a few oases, altogether embracing an area of about 12,000 sq. miles.

From 1821-84 the rulers of Egypt extended their sovereignty southwards over **Nubia**, **Kordofan**, **Darfur**, &c. A revolt of the Sudanese led to the abandonment of these southern provinces, but they have since been recovered. **Khartum** was retaken, September 1898, by the united English and Egyptian army.

The valley of the Nile has been the home of a dense population from the most remote period, and was the seat of one of the oldest civilisations of the world. Extensive remains of its former magnificence, in the form of pyramids, temples, tombs, colossal statues, &c., are scattered throughout the valley. The famous pyramids, near **Gizah**, and the vast ruins of **Thebes**, at **Luxor** and **Karnak**, are perhaps the most remarkable.

SURFACE.—The Nile Valley is the principal feature of Egypt. It is from ten to fifteen miles in width, and is bounded on each side by high rocks. Beyond the rocks on the east the ground rises to the borders of the **Red Sea**, where the barren mountains rise in places to an elevation of 9,000 ft.; on the west is the **Libyan Desert**.

The cultivated land includes: 1. The area watered by the Nile, which includes the **Nile Valley**, the **Delta**, and the depression known as the **Fayum**, which is watered by a canal from the Nile called the **Bahr Yusuf**, said to be 3,000 years old. 2. The oases, occupying depressions to the west of the river, those of **Khargeh**, **Dakhel**, **Farafrah**, and **Siwah** being the most extensive.

CLIMATE, &c.—The climate is hot and dry: the **Khamsin**, a hot desert wind, blows during the months of April and May. The productiveness of Egypt depends solely upon the annual rise of the Nile. This rise, which is due to the summer rains of the **Abyssinian Plateau** and of the countries further south, begins at the end of June and reaches its greatest height in September. Upon the height of the rise depends the amount of land which

can be irrigated; a low rise means a poor harvest, while a very high rise may cause serious destruction to the crops protected by artificial embankments. At Cairo an ordinary rise is about 25 ft. In Lower and Middle Egypt great irrigation works have been carried out, so that vast quantities of water are stored up and conveyed in all directions by a network of canals. The greatest of these works is the huge dam at Assuan, by which a large area has been rendered fertile.

AGRICULTURE.—Owing to the favourable climate and the irrigating of the land three crops are produced in a year. The most important are cotton, maize, wheat, beans, barley, sugarcane, millet, lentils, rice and dates.

TRADE.—Egyptian trade is steadily increasing. The chief exports are raw cotton and cotton seeds, grain, sugar, beans, &c.

Imports.—Cotton goods, coal, iron, machinery, timber. The greater part of the foreign trade of Egypt goes through the port of Alexandria.

THE SUEZ CANAL.—This canal is 87 miles long, including 21 miles of lake through which it passes.

POPULATION.—About 13 millions.

GOVERNMENT.—Egypt is a British Protectorate. The Head of the Government is the Sultan, who is assisted by a Council of Ministers.

MEANS OF COMMUNICATION.—1. The Nile is navigable without obstruction to the first cataract at Assuan, and during the flood to the second cataract at Wady Halfa. 2. **Canals.**—The Suez Canal, completed in 1869, extends from Port Said, on the Mediterranean, to Suez, a distance of 87 miles. A fresh-water canal connects Ismailia with the Nile, and the Mahmudieh Canal unites Cairo with Alexandria. 3. **Railways.**—Egypt has over 2,000 miles of railway, connecting all the principal towns of the Delta, and extending southwards for several hundred miles up the Nile Valley.

TOWNS.—The capital is Cairo (790), at the head of the Delta, the largest town in Africa. From the famous citadel, built by Saladin in 1166, a fine view of the surrounding country is obtained. Alexandria (444) is the chief seat of commerce. After the fall of Alexander's empire it became the capital of the Ptolemies, and was for a long period the centre of Greek learning. Rosetta and Damietta are situated at the two chief mouths of the river. Tanta and Zagazig are important towns in the Delta. In Upper Egypt the largest towns are Assiut (51), Kenneh, Esneh, and Assuan.

THE ANGLO-EGYPTIAN SUDAN.—This name has been given to the extensive region lying to the south of Egypt Proper, and embracing the districts known as Nubia, Kordofan, Darfur, &c.

The northern portion of this region is exceedingly dry, consisting mainly of desert, the only cultivated part being the valley of the Nile. Further south, where the Atbara and Blue Nile join the main stream, the rain begins to be more plentiful, and forests and grassy plains cover the country. Durrah and dates are the principal food-plants, and sheep and camels the

chief domestic animals. Caravans from Central Africa with **gold-dust**, **ivory**, and **slaves**, pass through this region. The **inhabitants** are mainly **Arabs** in the north and **Negroes** towards the south.

POPULATION.—About 5½ millions.

TOWNS.—The capital and the principal trading centre is **Khartum**, at the junction of the Blue and White Nile. **Omdurman**, the old Dervish capital, **Berber**, just north of the confluence of the Atbara and the Nile, and **Sennaar**, on the Blue Nile, are decaying towns. **Shendy**, between Khartum and Berber, is a great centre of caravan traffic. **El Obeid** is the chief town of Kordofan. **Sawakin**, since 1886, has been occupied by the English. **Port Sudan** is connected with **Berber** by railway.

The **Sahara** has an area of about 2,500,000 sq. miles; the fossils found throughout indicate that it was once the bed of a sea. A considerable portion consists of tableland, crossed in places by mountain ranges. Towards the north and west are low-lying plains called **Hofra**, or **Juf**. The **oases** near the Atlas are watered by surface streams; the others by underground streams and natural springs. The beds of many dried-up lakes form deposits of **salt**, which is exported to the Sudan. **Dates** are the principal food.

The **inhabitants** are chiefly **Tuaregs**, nomadic Berbers inhabiting the district between Algeria and the Niger, and **Tibus**, chiefly of Negro descent, who occupy the Western Sahara.

The camel caravans take three months to cross the Sahara at its narrowest part from Tripoli by the oases of Fezzan.

EXAMINATION PAPERS

- A. 1. What are the chief States of Northern Africa? Give their approximate area and population.
2. What races inhabit Africa north of the Sudan?
3. Describe the surface of Algeria.
4. Describe the climate of Northern Africa. Why is the district south of the Atlas very dry?
- B. 1. How has French occupation benefited Algeria?
2. What are the chief products of Egypt?
3. Name the seaports of Northern Africa. What articles would be exported from them?
4. What places are noted for the following products: - Coral, sponges, alfa-grass, leather, olive-oil, feathers, durrh, dates, salt, and wine?
- C. 1. Describe the surface of Egypt.
2. How is irrigation carried on in Egypt?
3. How has English influence developed the resources of Egypt?
4. Describe the Egyptian Sudan.
- D. 1. What are the chief products of the Sahara, and what do you know of its origin?
2. Explain the terms: tell, shotts, oases, the Khamsin.
3. Give the situation of Cape Ghir, the Blue Nile, river Mejerda, the High Atlas, El Juf, Fayum, and the Bahr Yusuf.
4. Give facts concerning Fez, Tangier, Constantine, Kairwan, Algiers, Tripoli, Ismailia, Khartum, Wady Halfa, Sawakin, Siwah, Siut, Bona, and Mekinez.

THE SUDAN

This name is applied to the region lying to the south of the Sahara, and between the Kong Mountains and the Nile. Here a more abundant rainfall produces a luxuriant vegetation, and with the exception of the valley of the Lower Nile this region is the most densely peopled portion of the continent.

PRODUCTS.—Agriculture is carried on throughout the district, and the fertile soil yields **durrah**, the chief food-plant, **maize**, **rice**, **cotton**, and **indigo**. The principal domestic animals are **cattle**, **horses**, and **camels**. The trade in **ivory** and **slaves** is carried on chiefly by the Arabs.

PEOPLE.—The Sudan is the home of the true **Negro** race. The **Fulbeh**, or **Fulah**, a mixed race, are the most energetic people of this district, and have founded several powerful States, of which **Sokoto**, **Gandu**, and **Adamawa**, are the most important. Around Lake Chad are the powerful **Negro** States of **Bornu**, **Bagirmi**, and **Wadai**. Throughout these States the **Muhammadian** religion prevails.

TOWNS.—There are numerous towns in the above States, many of which are of considerable size. **Segu**, on the Niger, is the capital of the **Fulah** State of **Bambara**. **Timbuktu**, near the northern bend of the Niger, is the principal centre of the caravan traffic between the Western Sudan and Northern Africa. It is now possible to reach **Timbuktu** from Europe by rail and steamer. **Kano**, in **Sokoto**, is a great trading centre. **Rabba**, on the Niger, marks the limit to which large vessels can ascend the river. **Kuka**, the capital of **Bornu**, is said to be the largest town in the Sudan.

WESTERN AFRICA

GENERAL DESCRIPTION.—This is the district extending from the river Senegal to the Orange River. It is now almost exclusively under European influence; the only native States of importance were the kingdoms of **Dahomey** (now French) and **Ashantee** (now British), on the Guinea Coast, and the **Negro** republic of **Liberia**, originally founded for freed slaves.

The coast region, from the Senegal to the Congo, has a hot, moist climate, and is particularly unhealthy for Europeans. South of the Congo the coast strip has a deficient rainfall. This arid district increases in width towards the south, where the **Kalahari** desert extends inland to the river **Limpopo**.

I. BRITISH POSSESSIONS.—1. **Northern Nigeria** contains about 258,000 sq. miles and over 10,500,000 inhabitants, the great majority of whom are negroes.

The chief product of the coast country is **palm oil**; **rubber**, **ivory**, **hides**, **ostrich-feathers**, &c., in the interior. The chief imports are **cotton goods**, **hardware**, **provisions**, and **salt**. The internal trade is carried on by caravans, but a railway has been constructed. The chief towns are **Asaba**, **Rabba**, and **Zingeru**.

2. **Southern Nigeria.**—This contains also the old Colony and Protectorate of **Lagos**. Its area is about 78,000 sq. miles, and it has a population of about 8,000,000, mostly negroes.

The chief products are palm oil, rubber, cocoa, cotton, coffee, gum, &c. The cotton industry is making rapid strides. Much of the trade is done by caravans, and there are about 1,100 miles of railway in the whole of Nigeria. The chief town is **Lagos**.

3. **Gold Coast.**—This also includes **Ashanti**. Its area is about 80,000 sq. miles, with a population of about 2,000,000, of whom only about 700 are whites. The chief exports are palm oil, rubber, and cocoa. Gold is also being obtained in increasing quantities. The chief towns are **Cape Coast Castle** and **Accra**.

FIG. 214.—WESTERN AFRICA.



4. **Sierra Leone.**—It consists of a **Colony** on the coast and a **Protectorate** inland, with a total area of about 34,000 sq. miles and a population of over 85,000. It exports palm oil, ginger, rubber, &c. **Freetown** is the most important town and seaport.

5. **Gambia.**—The Colony is only 4 sq. miles, with a population of about 9,000; but the Protectorate has an area of about 4,100 sq. miles, with about 200,000 people. It exports ground nuts, hides, cotton, rubber, &c. **Bathurst** is the capital and seaport.

6. **Togo Land**, between Dahomey and Ashanti, taken by the British in 1914. The **Kamerun Protectorate**, a district extending from the Bight of Biafra to Lake Chad. **South-West Africa**, a district between Cape Frio and the Orange River, and extending inland to the Bechuanaland Protectorate (taken by South African forces in 1915).

II. FRENCH POSSESSIONS.—The French territories consist of **French Equatorial Africa** (including part of the late German Kamerun), **Senegal**, **Dahomey**, **Ivory Coast**, &c. The chief settlements are **Senegal**, of which **Fort Louis** is the capital, and **French Congo**, which extends inland to the Nile Basin. **Dahomey** is now a French protectorate. **Abomey** is the capital and Whydah the chief port.

III. PORTUGUESE WEST AFRICA.—This extends from the Congo to Cape Frio and inland to the Upper Zambesi. The area is about 500,000 sq. miles. The highland region behind the arid coast district is a rich land with a healthy climate, and produces **coffee**, **palm oil**, and **rubber**.

Loanda is the capital and chief port. **Benguela** and **Mossamedes** are the only other important stations.

IV. THE BELGIAN CONGO.—This State has an area of nearly one million sq. miles, and includes most of the basin of the Congo. It is now practically under Belgian administration. The Congo is navigable to **Matadi**; from here rapids obstruct the navigation for about 200 miles. A railway has been constructed from **Matadi** to **Leopoldville**, above the falls, from whence the river is navigable for 1,000 miles to Stanley Falls, and has in places a width of ten miles. A part of German East Africa in the neighbourhood of Lake Tanganyika has been placed under Belgian protection.

The chief exports are **palm oil**, **ivory**, and **rubber**.

Boma is the principal port.

Native State.—**Liberia** is an Independent Negro republic, founded in 1820 for freed slaves, lying south of Sierra Leone. **Monrovia** is the capital. The **Kroomen**, a native race inhabiting the coasts of Upper Guinea, make excellent sailors.

EXAMINATION PAPERS

- A. 1. Give the boundaries of the Sudan. Account for its fertility.
2. How is trade carried on in the Sudan, and what are the chief means of communication?
3. What are the most important States of Central Africa, and where are they situated?
4. Show how Western Africa is under European influence.
- B. 1. What are the typical exports of Western Africa? and give the chief ports from which they are shipped.

2. What are the principal British possessions in Western Africa? and name the chief towns.
3. Give the situation of the following:—Freetown, Port Louis, Loanda, Leopoldville, Rabba, Kuka, Stanley Falls, and Timbuktū.
4. What are the two great waterways of Western Africa? Describe them.

BRITISH SOUTH AFRICA

The greater portion of Southern Africa is now under British control. It consists of colonies and protectorates. The principal divisions are:—

The Union of South Africa, which includes the Provinces of:—

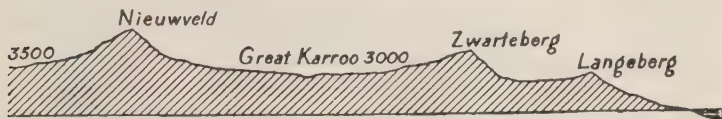
	Sq. miles	Whites	Coloured
Cape of Good Hope (including Griqualand, Pondoland and Bechuanaland)	276,966	651,000	2,129,000
Natal	35,284	137,000	1,289,000
Orange Free State	50,389	189,000	439,000
Transvaal (including Swaziland)	110,450	544,000	1,541,000
South-West Africa (British Protectorate)	322,000	19,000	208,000

Rhodesia	438,000	36,000	1,787,000
Nyassaland Protectorate	39,600	1,400	1,000,000
Bechuanaland Protectorate	275,000	1,700	125,000
Basutoland	11,716	1,600	497,000

RELIEF.—The land rises from the sea in well-marked terraces, known as **Karroos**, the edges of which, on the seaward side, present the appearance of mountain chains. The strip between the sea and the first terrace includes some very fertile districts; the northern border is known under various names—**Langeberg** (Long Mountains), &c. Ascending this wall, we come to the **first terrace**, a productive region bounded on the north by a higher range known as the **Zwarteberg** (Black), rising in places over 6,000 ft. Beyond this range comes the **second terrace**, known as the **Great Karroo**, a district of scanty rainfall 300 miles long and about 70 miles wide, bordered on the north by the true mountain range known as the **Roggeveld** (Rye), **Nieuwveld** (New), **Sneeuwberg** (Snow), &c., rising in **Compassberg** to a height of 7,800 ft. This range is continued to the north-east as the **Drakenberg** (Dragon) or **Quathlamba Mountains**, the highest points of which are **Mont-aux-Sources** and **Cathkin Peak**, over 10,000 ft. in altitude. Beyond this third range comes the **third plateau**, extending north and west, with a slight slope to the Orange River, beyond which is the **Kalahari Desert**, where but little water is found, but which is covered in places with grass, creepers, and even

shrubs; towards the west, however, vegetation is almost entirely absent.

FIG 215.—SECTION ACROSS SOUTH AFRICA.



The mountains are massive in outline, and do not as a rule rise to high peaks, but are generally flat-topped. The **Table Mountain**, 3,600 ft., near Cape Town, is a notable example. The karroos generally slope inland, but the rivers which rise in the main mountain range find their way to the sea through the edges of the plateaux by deep gorges called **Kloofs**. During the dry season the karroos are hard, parched, and destitute of vegetation; the roots of the plants are, however, protected against the heat by a woody covering, and in a short time after the rains the surface of the plains is overspread with flowers and grasses.

COAST-LINE.—The coast-line resembles that of Australia in its unbroken character and in its absence of many good harbours. On the west it is sandy, backed by hills; on the south, rocky and hilly on the whole. North of Port Natal it is low and sandy or muddy. On the south the extensive **Agulhas Bank** causes shallow water for a considerable distance from the coast. The principal inlets are **St. Helena, Saldanha, Table, and False Bays**, at the south-west corner; **Mossel and Algoa Bays**, on the south; and **Walvisch Bay**, in Damaraland. The chief capes are the **Cape of Good Hope** and **Cape Agulhas**.

CLIMATE AND RAINFALL.—The atmosphere is clear and dry, and the climate on the whole exceedingly healthy. The low coast region of Natal, the Zambesi Valley, and parts of the Transvaal are, however, subject to fevers.

The rainfall varies considerably, from 43 inches at Durban, on the east, to 2 inches at Port Nolloth, on the west.

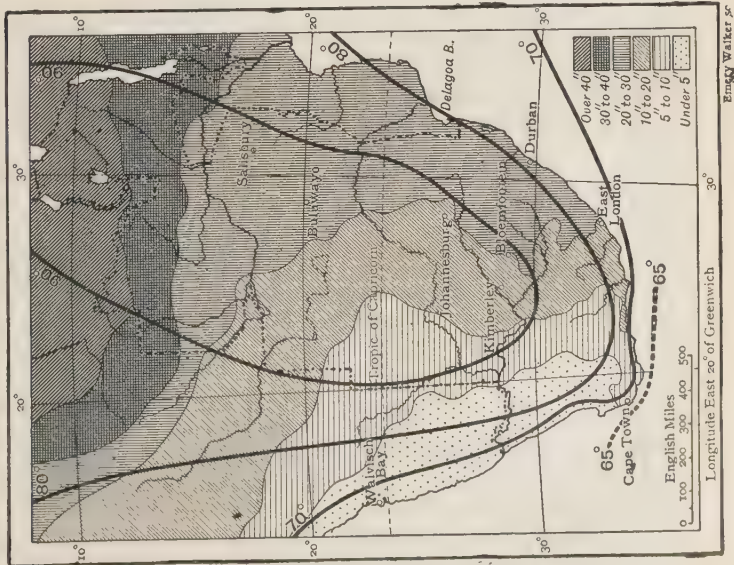
The trade winds blow towards the land on the eastern side, but away from it on the west. The plains of the interior become more heated in summer than the ocean, and cause an indraught from the sea towards the land. This indraught strengthens the winds on the eastern side, and their moisture is condensed on the east coast range of mountains; hence this side is plentifully supplied with rain. On the west the winds from the sea are met by those from the land and blow with but little force, and, as they blow from a cooler to a warmer district, they retain most of their moisture. The rainfall on the eastern side occurs chiefly from September to April, increasing in volume towards the north and diminishing towards the west. On the Great Karroo the average amount is not more than nine inches yearly, while towards the mouth of the Orange River the district is almost rainless.

The south-western corner of the Cape of Good Hope is beyond the limits of the trade-winds and is under the influence of the north-westerly winds. Here the rainfall occurs chiefly from April to October.

FIG. 216.—BRITISH SOUTH AFRICA: PHYSICAL.

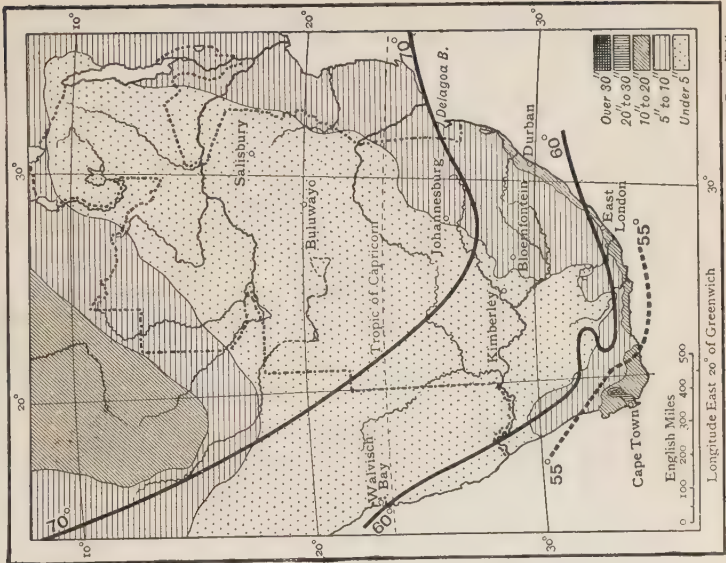


FIG. 217.—BRITISH SOUTH AFRICA: JANUARY ISOTHERMS
AND SUMMER RAINFALL, NOVEMBER TO APRIL.



Emery Walker sc.

FIG. 218.—BRITISH SOUTH AFRICA: JULY ISOTHERMS
AND WINTER RAINFALL, MAY TO OCTOBER.



Emery Walker sc.

RIVERS.—The rivers of the Cape of Good Hope are of little use for navigation, being torrents after the rains and almost dry at other times, somewhat resembling in this respect the wadies of Northern Africa. Their mouths, too, are mostly obstructed by bars formed by the sediment brought down by the floods.

The chief river is the **Orange**, which rises in Mont-aux-Sources, in Basutoland, and forms to a great extent the northern boundary of the Cape of Good Hope. Its chief tributaries are the **Caledon** and **Vaal**, from the Orange Free State and Transvaal—the **Molopo** on the north, and the **Hartebeest** on the south. The two last-mentioned streams, although of considerable length, are only filled with water after the rains. After passing over the Falls of Aukrabies the Orange finally enters the Atlantic.

The chief rivers draining the south side of the main water-parting are the **Olifants** and **Berg**, on the west; the **Breede**, **Gauritz**, **Gamtoos**, and **Sunday**, on the south; and the **Great Fish**, **Great Kei**, **St. John's**, and **Tugela Rivers**, on the south-east.

The **Limpopo** forms the northern boundary of the Transvaal and, after making a great curve of over 1,000 miles, enters the Indian Ocean in about the same latitude as its source.

A considerable portion of the **Zambesi** flows through Rhodesia.

ANIMAL LIFE.—South Africa has a great abundance, as well as a great variety, of animal life. The larger wild animals, however, are now but rarely found in the south. The leopard, jackal, hyæna, and lion are the most destructive of the carnivora. Vast herds of antelopes (known as bucks), quaggas, zebras, and gnus roam over the plains; while the giraffe, rhinoceros, hippopotamus, and elephant are found further north. Baboons often commit great ravages in the gardens of the settlers.

Of the birds, the ostrich is the chief; eagles, vultures, secretary birds, bustards, pheasants, partridges, and quails are also very numerous.

Among the reptiles are the python, numerous poisonous snakes, such as the mamba, pofadder, cerastes, &c.

Insects are well represented. Locusts often commit great ravages, while the bite of the dreaded tsetse-fly is fatal to horses, oxen, and some other large animals.

The principal domestic animals are sheep, cattle, horses, Angora goats, and ostriches.

VEGETATION.—There are few forests in the south, trees being chiefly confined to the coast ranges and the kloofs; towards the tropics, the camel-thorn, mimosa, bread-fruit, baobab, and palms are found. Flowers grow in great profusion and variety; numerous species of heaths, bulbs, orchids, and prickly plants are widely distributed. Grasses are well suited for grazing. Fruits are abundantly grown; the vine, introduced by Huguenot refugees, has been grown with great success in the neighbourhood of Constantia. Wheat, maize (known as mealies), millet, and tobacco are common crops.

MINERALS.—Diamonds, copper, iron, lead, zinc, manganese, and gold are all found. The most productive gold-fields are those of the Transvaal.

MEANS OF COMMUNICATION.—About 3,080 miles of railway are already open, and other lines are in process of construction. The principal railways are:—

1. The **Western** system, which starts from Cape Town, crosses the Great Karroo, and runs through Kimberley to Vryburg, thence through Mafeking to

Buluwayo, and on to Salisbury, in Rhodesia; a branch has also been laid between Buluwayo and Victoria Falls. This railway is being pushed forward to the north, and has already been extended beyond Broken Hill. Salisbury is connected with the coast by a line that runs through Portuguese territory to Beira.

2. The **Midland**, which starts from Port Elizabeth, and is continued on to Pretoria, in the Transvaal.

3. The **Eastern**, which starts from East London, and communicates with the other two systems.

4. A line from Durban runs to Johannesburg.

5. A line from Lorenzo Marques, on Delagoa Bay, to Pretoria in the Transvaal. This line affords the shortest means of communication between the Transvaal and the coast.

6. The Cape lines are joined up with the railways in South-West Africa.

PEOPLE.—The natives consist of two great divisions: 1. The **Hottentots**, a small, stunted race, of a dirty yellow colour, inhabiting the west of the colony. They live in kraals, and possess large herds of cattle and fat-tailed sheep. The **Bushmen**, an allied race, are still smaller, and lower in the scale of civilisation. They inhabit the Kalahari and Damaraland, and are expert hunters. Both races are diminishing in numbers.

2. The **Kaffirs**, a branch of the great Bantu family, inhabit the eastern districts. They are a tall, athletic, warlike race, and own large herds of cattle. Maize, millet, and milk form their principal food. The **Zulus**, **Basutos**, **Mashonas**, and **Matabele** are some of the chief tribes.

UNION OF SOUTH AFRICA

In 1910 the self-governing colonies of the **Cape of Good Hope**, **Natal**, **Orange Free State**, and the **Transvaal** united as the **Union of South Africa**. The **Protectorate of South-West Africa**, taken from Germany in the Great War, is under the Union Government. The executive government is vested in the King, who is represented by a Governor-General and Ministers of State. Pretoria is the seat of the Government and Cape Town of the Legislature. The Parliament consists of two Houses, a Senate and a House of Assembly. Each province has an administrator and a Provincial Council. **Bechuanaland** and **Basutoland** are governed by administrators under the High Commissioner. The territories of **Rhodesia** are administered by the Company's officials, acting under the authority of the High Commissioner.

Provinces.—1. The **Cape of Good Hope** has an area of about 277,000 sq. miles and a population of about 2,780,000, of whom more than two-thirds are natives. The natives are branches of the great Bantu family and form the bulk of the population of the Eastern Province. The Cape of Good Hope contains stretches of fertile land mostly near the coast, and large areas of karroo where the rainfall is scanty. The rainfall near the coast is sufficient for agriculture, and the combination of a warm temperate climate, good rainfall, and a fertile soil, enables the farmers to produce good crops of grapes, wheat, oats, barley, and fruits such

as peaches, apricots, oranges, lemons, &c. The people are mostly employed in agriculture, and ostrich farming is common throughout the country.

INDUSTRIES.—Agriculture.—The area under cultivation is small when compared with the great farms upon which sheep, cattle, horses, goats and ostriches are raised. Mealies and kaffir corn, wheat, oats, and barley are the chief crops. The vine is largely cultivated in the south-west corner of the country.

Mineral.—The diamond mines at Kimberley are the richest in the world.

Trade.—Exports: wool, ostrich feathers, hair (angora), wool, and copper ore, fruit and wine.

Imports: Cotton, woollen, linen and silk goods, steel and iron goods, machinery.

The great bulk of the trade is with the United Kingdom, and most of it goes through Cape Town.

TOWNS.—**Cape Town** (207 with suburbs), the capital, has a fine, healthy situation at the foot of Table Mountain. It has many fine buildings, and is the seat of the South African University. It possesses an artificial harbour and is the chief seaport. **Simon's Town**, on False Bay, is the South African naval station. **Port Elizabeth** (33), on Algoa Bay, has a large trade with the interior. **East London** is the principal port for the east. **Stellenbosch**, **Paarl**, **Malmesbury**, **Swellendam**, and **Uitenhage** are the chief towns of the coast strip. Inland are—**Grahamstown** (11), the principal town of the eastern district; **Beaufort West**, at the foot of the Nieuwveld, the centre of the sheep-farming district; **Graaf Reinet**, on the Sunday River, one of the oldest towns in the colony; and **King William's Town**, the capital of the eastern districts and the centre of trade with the natives. **Ookiep** is the centre of the copper-mining industry. **Kimberley** (34), in Griqualand West, is the most important town of the diamond district.

2. **Natal**, sometimes called the Garden Colony, is a beautiful country sloping gradually from the sea to the Drakenburg Mountains. It is mostly rolling uplands, has a fertile soil and an abundant rainfall. The alluvial soil near the coast is suitable for the production of sugar and cotton, and upon the higher land of the interior, maize, wheat, and other crops flourish. Fruits such as bananas, oranges, limes, pine-apples, &c., are abundant. A large part of the population are Kaffirs, and there are also about a hundred thousand Indian coolies that have been brought in to work upon the sugar and other plantations. Most of the coast-line is sandy, but there is one good opening, the entrance to which has been deepened so as to admit of large ships coming inside the harbour, at Durban.

Industries.—Mainly agricultural. The chief crops are maize, sugar, potatoes, Kaffir corn and fruits, but maize is by far the most important crop. The live stock consists mainly of sheep, cattle and goats.

Mining.—Coal is obtained in the northern part of the country, and considerable quantities are exported.

FIG. 219.—SOUTH AFRICA: POLITICAL



Walker & Bowdler

Trade.—Natal trades with the Transvaal and the other Colonies, and a large part of the foreign Transvaal trade goes through the port of Durban.

Exports.—Coal, wool, hides and skins, fruit.

Imports.—Cotton, woollen, linen and silk goods, machinery, clothing.

TOWNS.—Durban (146) is the chief port. It is a thriving, prosperous town, and has a considerable trade with the Transvaal and Orange Free State. Pietermaritzburg (36) is the capital.

3. **The Orange Free State.**—The Orange Free State lies between the Vaal and Orange Rivers. It consists of rolling uplands and contains a large amount of fertile soil. It has a fine climate, a sufficient rainfall, and the conditions are favourable to pastoral and agricultural pursuits. Its area is about 50,400 sq. miles, with a population of about 629,000, of whom about 187,000 are whites.

In 1836 a number of Boers who were dissatisfied with British rule in Cape Colony trekked across the Orange River and founded a Republic, which was annexed in 1900 during the Boer war.

INDUSTRIES.—The chief industry is agriculture; wheat, mealies, and other crops are raised. Large numbers of horses, cattle, sheep, and pigs are reared.

Mining.—Coal, diamonds, and gold are found, and the output of coal is steadily increasing in quantity.

COMMERCE.—The trade is mainly with the other South African countries and with the United Kingdom.

Exports.—Diamonds (the most valuable), wool, hides and skins, mealies and wheat.

Imports.—Cotton goods and clothing, articles of food and drink, wood and hardware.

TOWNS.—Bloemfontein is the capital. It is connected by railway with the chief towns in the Cape of Good Hope, the Transvaal, and Natal. Its population is about 39,000.

Harrismith lies near the Natal border and is a trading centre.

Ladybrand is near the borders of Basutoland and is the centre of a wheat-growing district.

4. **The Transvaal.**—The Transvaal lies to the north of the Orange Free State, between the Vaal and Limpopo Rivers. It is a high plateau of gently rolling uplands and a large area of fertile soil. It has a fine bracing climate with an ample rainfall, and owing to the elevation above sea-level there is a great variation in temperature, and though in the summer it is very hot in the daytime, the nights are cool. Its area is about 110,000 sq. miles, of which about 6,500 sq. miles is Swaziland. The census of 1921 gave a population of about 2,087,000, of whom about 443,000 were whites.

The Transvaal was first settled by Boer farmers who trekked from Cape Colony in 1836-7 and founded a Republic. In

consequence of troubles with the natives it was annexed to Great Britain in 1877, but regained self-government in 1881, subject to the suzerainty of the British Crown. It was annexed to Britain in 1900 under the title of the Transvaal Colony. Responsible Government was granted in 1906.

INDUSTRIES.—Agriculture.—The Transvaal is better suited to stock-raising than to agriculture, and there are large numbers of cattle, sheep, angora goats, pigs, and horses. About 2 million acres are under cultivation, the chief crops being maize, Kafir corn (mealies), and tobacco. Grazing lands amount to about 30 million acres.

Mining.—The most valuable are gold, coal, and diamonds. The Rand Gold Fields are the most valuable in the world. The value of the gold raised in 1921 was over £43,000,000.

COMMERCE.—Imports.—The chief articles were clothing, machinery, chemicals, meat, live stock, and foodstuffs.

Exports.—The chief articles were gold (£34,000,000), diamonds, wool, skins, hides, &c.

TOWNS.—Johannesburg, on the Witwatersrand, is the largest town and is the centre of the gold-mining industry. It has a population of about 152,000 (whites only); 288,000, including natives.

Pretoria, a beautiful town lying about 30 miles from Johannesburg, is the capital (45,000) (whites only); 74,000, including natives.

Basutoland is an upland country lying between Natal, Cape of Good Hope, and the Orange Free State. It is a land of rolling plateau surrounded by mountains and crossed by rapid rivers which have cut deep channels through the soil. The soil is fertile and produces enormous crops of mealies and Kafir corn. It is inhabited by about 495,000 Basutos, a warlike and industrious people. It is a Crown Colony, and the centre of the Government is at Maseru. A thriving mission station and educational centre is at Morija.

5. **The Protectorate of South-West Africa.**—The Peace Treaty put this country under the administration of the Union Government.

It lies between the Kunene and Orange Rivers and merges into the Kalahara Desert on the eastern side.

Its area is about 320,000 sq. miles, and its population is about 120,000, of whom about 19,000 are whites, mostly Germans.

INDUSTRIES.—Almost entirely agricultural.

TRADE.—The country exports live stock, horns, hides, ostrich feathers, as well as diamonds, copper, and lead. It imports textiles, metal goods, foodstuffs, &c.

SEAPORTS.—Swakopmund and Luderitzbucht.

RAILWAYS.—The railways connect the chief towns, and form part of the Union Government Railway system.

TOWNS.—Windhuk, the capital, is the only town of any size.

BECHUANALAND.—The Crown Colony is a grassy plateau, extending northwards from Cape Colony to the Molopo River. Water is chiefly obtained by sinking wells. The Bechuanas grow maize and rear cattle. **Vryburg**, on the railway, is the seat of the administration. **Mafeking**, at the north-eastern corner, is the chief trading centre. **Kuruman** is the scene of Moffat's missionary work. The Protectorate of Bechuanaland extends northward from the Crown Colony to latitude 22° S. The chief products are ivory, maize, cattle, hides, wax, and gum. The main trade route goes by **Shoshong** the old capital of the Bamangwato tribe, through **Palapye**, the present capital.

RHODESIA.—A vast territory which includes the whole of the country which stretches northwards from the borders of the Transvaal to the Belgian Congo and Tanganyika Territory, to the east as far as Portuguese East Africa, and to the west to Portuguese West Africa. All the country lying to the south of the River Zambesi is called Southern Rhodesia, and the northern territory is divided into North-Western Rhodesia and North-Eastern Rhodesia.

Southern Rhodesia consists of the two provinces of Mashonaland and Matabeleland, which are fruitful, well-watered, and rich in minerals, particularly gold.

The **Matabele**, a race of Zulu Kaffirs, were the dominant tribe, holding the neighbouring tribes in subjection. In 1893 their aggressions led to an invasion of their country by the Company's forces. Their power was broken, and **Buluwayo**, the capital of their chief, Lo Bengula, was captured.

The centre of administration is **Salisbury**, in Mashonaland, which is connected by telegraph and road with **Mafeking**. A railway from Beira, on the east coast, in Portuguese territory, has been completed through Chimoio and Umtali to Salisbury.

The Barotse district of the Upper Zambesi is the most thickly peopled portion.

NYASSALAND.—A district extending along the river Shire and the west side of Lake Nyassa. The chief town is **Blantyre**, near the Shire. **Zomba** is the seat of the administration. **Livingstonia** is a settlement on Lake Nyassa. **Chinde** (Portuguese), on the navigable mouth of the Zambesi, is the port for the district. The chief exports are tobacco, cotton, and tea.

EXAMINATION PAPERS

- A. 1. Name the British Colonies and Protectorates in South Africa.
2. Describe the relief of the Cape Province.
3. What are the characteristic features of the coast of South Africa? Name the chief inlets.
4. Why is the rainfall more abundant on the east of South Africa than on the west?
- B. 1. Examine the isotherm of 90° and describe the physical conditions that cause the summer heat of the Transvaal and Rhodesia.
2. What are the causes of the small rainfall of South-west Africa?
3. Give the causes of the equable climate of Cape Town and the country near to it.

4. From a study of the Rainfall Maps and the Physical Map of South Africa, what parts of the country would you expect to be most suitable for farming operations?
- C. 1. Name the three great rivers of South Africa, and describe their courses.
2. What are the Karroos, and what industries are connected with them?
3. Give the situation of the chief ports of South Africa.
4. What are the most common plants, animals, and minerals of the Cape Province?
- D. 1. How would a traveller from England reach the following places:—Johannesburg, Salisbury, Vryburg?
2. What are the chief industries in (1) the Cape Province, (2) Natal?
3. Give the situation of the Zwarteberg, Nieuwveld, Tugela, Nyassaland.
4. Why are the following important: Kimberley, Ookiep, Grahamstown, East London?
- E. 1. What are the most important exports of (1) the Cape Province, (2) Natal?
2. Describe the situation and products of the Transvaal.
3. Where are the following:—Mashonaland, Walvisch Bay, Pretoria, Bloemfontein, Blantyre, Pietermaritzburg?

EASTERN AFRICA.

GENERAL DESCRIPTION.—This name is applied to the regions lying between Delagoa Bay and the Egyptian frontier. The whole district is now under control of **Portugal, England, and Italy.**

This part of Africa is at present but little developed. The coast district in many parts is very unhealthy. Goods are carried by **human porters** in British and German East Africa, the tsetse-fly and the climate preventing the use of cattle and horses as beasts of burden. Farther north, in Somaliland, where the climate is drier, the **camel** is used.

The **exports** are of a similar character throughout the district, the chief being **oil-seeds, rubber, ivory, gums, and hides.**

1. **PORTUGUESE EAST AFRICA** extends along the coast from the south of Delagoa Bay to the River Rovuma. Inland it is bounded by the Transvaal and the British Territories, extending along the lower course of the Zambesi to the confluence of the Loangwa. Its **area** is estimated at about 290,000 sq. miles.

The coast lands lie low, and the **climate**, especially in the Zambesi delta, is exceedingly unhealthy. **Fruits** of all kinds, **cotton, sago, tobacco, sugar-cane, indigo, coffee, and grain** grow in abundance. **Gold** is also found, but is not worked to any extent. The **tsetse-fly** prevents cattle-rearing, hence most of the commerce is carried on by **caravans of human porters.**

The chief **exports** are **oil-nuts, rubber, and ivory.**

DIVISIONS AND TOWNS.—The district is divided into two provinces—**Lorenço Marques** and **Mozambique**—separated by the Zambesi. The chief towns are: **Lorenço Marques**, an important seaport upon an excellent harbour on Delagoa Bay, and the starting-point of a railway to the Transvaal, for which it is the nearest outlet. **Beira**, to the north of Sofala, has a good harbour, and is the nearest port to Mashonaland, with which it is connected by a railway to **Salisbury**.

Chinde, **Quilimane**, **Sena**, and **Tetê** are the chief stations on the Zambesi. **Mozambique** is the capital of the northern district.

2. The **TANGANYIKA TERRITORY** (late German East Africa, under British protection) has an area of about 380,000 sq. miles, and extends along the coast from the River Rovuma to a line drawn from the neighbourhood of the island of Pemba by Mount Kilimanjaro to Lake Victoria Nyanza. Westwards it extends to Lake Tanganyika. Part of the western area near Lake Tanganyika is under Belgian protection.

The chief exports are ivory, rubber, and copal gum.

Bagamoyo, **Dar-es-Salam**, and **Kilwa** are the chief ports.

3. **KENYA COLONY** extends along the coast from the borders of the Tanganyika Territory to the River Juba, and inland to the Congo Free State and along the Upper Nile Valley. The estimated area is about 305,000 sq. miles. For administrative purposes it is divided into **The East Africa Protectorate**, **The Kenya Colony**, and **The Uganda Protectorate**, all being under Imperial control.

The River **Tana** is navigable for about 300 miles, and the **Juba** for 400 miles from the coast. **Lake Rudolf** is an extensive lake in the interior. The chief exports are cotton, coffee, grain, and oil seeds; hides and skins. **Mombasa** has a fine harbour, and the Uganda Railway has been completed from Mombasa to Kisumu on Lake Victoria Nyanza. **Nairobi** is the capital.

THE ZANZIBAR PROTECTORATE.—Zanzibar and Pemba, two islands off the coast, are now all that remain of an Arab State that once ruled over the neighbouring coast. The State is now under British protection. **Zanzibar** (50), the chief town, is the most important trading station in this district.

THE SOMALILAND PROTECTORATE.—The **Somali Coast**, to the south of the Gulf of Aden, has an area of about 68,000 sq. miles, and is a British protectorate. **Berbera** and **Zeila** are the principal ports. A considerable trade is carried on with **Harrar** in the interior, the great centre of caravan traffic in Eastern Africa.

The chief exports are coffee, hides, ostrich feathers, ivory, and gums.

The **WITU PROTECTORATE** at the mouth of the River Tana.

4. The **ITALIAN POSSESSIONS AND PROTECTORATES** have an area of about 188,000 sq. miles, and include, besides the Colony of **Eritrea**, with an area of 88,000 sq. miles, a **Protectorate** on the **Somali Coast**, extending northwards from the River Juba and confined to a coast strip 180 miles wide. The seat of government of Eritrea is at **Massaua**.

Massaua and **Assab**, on the Red Sea, are the chief ports. The inhabitants are chiefly engaged in pastoral occupations.

ABYSSINIA, an ancient empire, has since 1896 ceased to be an Italian protectorate, and has recovered its independence.

The chief exports are **skins, ivory, and gums.**

Tigre, Amhara, and Shoa are the chief divisions, and **Gonda, Adua, and Ankobar** the principal towns.

AFRICAN ISLANDS

Most of the islands are elevated and of volcanic formation. They are all in the hands of European States.

1. **PORTUGUESE.**—The Azores have a healthy climate, and produce vast quantities of **oranges (St. Michael) and pineapples.**

Madeira has a mild climate, and is a resort of invalids. **Funchal** is the chief town, and **wine and fruit** are exported.

The **Cape Verde Islands** lie about 350 miles from the African coast. **St. Vincent** has an excellent harbour, and is a place of call for Atlantic steamships.

Prince's Island and **St. Thomas** are situated in the Gulf of Guinea, and produce **sugar, cacao, and quinine.**

2. **SPANISH.**—The **Canary Islands** export **cochineal** and **early vegetables.** The largest island contains the volcano of **Teneriffe**, 12,000 ft. high.

Fernando Po and **Annobon** are mountainous islands in the Gulf of Guinea.

3. **BRITISH.**—**Ascension, St. Helena, and Tristan da Cunha,** in the Atlantic, are now of little importance. **Ascension** is noted for its turtle. **St. Helena** has a good harbour; **Napoleon** died here in 1821.

Mauritius, a beautiful island in the Indian Ocean, has an area of 713 sq. miles, and a population of 385,000, chiefly coolies. **Sugar** is the chief production; next in importance come **rum, vanilla, aloe-fibre, and cocoa-nut oil.** **Port Louis (54)** is the chief town.

The **Seychelles**, further north, formerly a dependency of the Mauritius and now a separate colony, export **cocoa-nuts** and **cocoa-nut oil.**

Socotra, a dependency of **Aden**, is situated to the east of **Cape Gardafui.** **Aloes** are the principal export.

4. **FRENCH.**—The island of **Bourbon** lies to the south-west of the Mauritius, and exports **sugar, coffee, and spices.**

The **Comoro Islands** lie to the north-west of **Madagascar**; **sugar** is the chief product.

Madagascar, one of the largest islands in the world, has an area of 228,000 sq. miles and a population estimated at 3,600,000. A range of mountains of volcanic formation traverse the interior from north to south, rising to a height of 9,000 feet. The rain-fall is very abundant on the east coast, and there the vegetation is very luxuriant, dense forests covering much of the surface between the coast and the mountains. In the south and west the land is poor and sandy.

The chief food plants are rice and manioc; the chief industries are cattle-rearing and agriculture; the exports are cattle, rubber, hides, and coffee.

The Hovas, a people of Malay descent, are the ruling tribe. Antananarivo is the capital, and Tamatave, on the east coast, is the chief port.

The French had long had settlements on the coast. In 1895 they sent an expedition; the capital Antananarivo was taken and a protectorate declared over the whole island. In 1896 it was formally declared a French colony.

EXAMINATION PAPERS

- A. 1. How is Eastern Africa divided among the European States?
2. What are the chief rivers of Eastern Africa? How is their commercial value lessened?
3. Mention the chief exports of Eastern Africa, and show how they indicate any characteristic features of the interior.
4. Explain clearly the position of the following places, and say why they are important: - Beira, Lorenço Marques, Berbera, Massaua, Zanzibar, Chinde, and Mombasa.
- B. 1. Describe the island of Madagascar.
2. What are the chief exports of the Azores, Canaries, Mauritius, Ascension, Fernando Po, and Socotra?
3. The islands of Africa may be said to be in two great groups. Mention the islands composing each group.
4. Give the situation and facts concerning Tamatave, Port Louis, Uganda, Teneriffe, Quilimane, Tetè, Bagamoyo, Gondar, Harrar, and Tristan da Cunha.

AMERICA

AMERICA is the name of the great mass of land in the Western Hemisphere which extends from 72° N. lat. to 54° S. lat. (*i.e.* 126 degrees of latitude). The two great divisions are called North and South America, and the narrow connecting strip is the Isthmus of Panama.

Comparison of the General Relief with that of the Old World.—The area of America is only one-half of that of the great mass of land in the Eastern Hemisphere. **Asia, Africa, and Europe** are 32½ millions of sq. miles; **America** is 16½ millions of sq. miles in extent. A line from **Behring Strait** to **Cape Horn** is about the same length as one from **Behring Strait** to the **Cape of Good Hope**; and these lines would pass through the main elevated portions of the land surface. The long slope of **America** is towards the Atlantic, while that of the **Eastern Hemisphere** also inclines towards the Atlantic. The short slopes are separated by the broad **Indian and Pacific Oceans**. Towards the centre of each is a great inland sea—viz. the **Mediterranean** in the Eastern Hemisphere and the **Gulf of Mexico** in America—dividing the continents and producing some similarity of shape. Thus, **South America** is like **Africa** in having its widest portion in the north and tapering to the south, with few openings. **North America**, like **Europe**, is much indented.

HISTORY.—Though it is called the New World, America consists of very ancient rocks, and traces of the oldest races of men exist there. It is supposed that America was peopled from Asia by way of **Behring Strait**. American people have never become colonisers or conquerors of distant lands. The highest early civilisation was attained in **Mexico and Peru**, where vast monuments remain testifying to their skill as builders and engineers of roads, fortifications, aqueducts, &c.

DISCOVERY.—The first Europeans known to visit America were the **Norsemen**, who in the tenth century passed from **Iceland** to **Greenland** (then

probably less ice covered and barren than now), and thence sailed along the eastern shores of North America; but they did not become permanent settlers, and their discovery faded into a tradition.

In 1492 **Christopher Columbus**, sailing west to find a shorter route to **China** and **India**, accidentally discovered the **West Indies**, and took possession of them for Spain. In the following years many **Spaniards** and **Portuguese** sailed from Europe, and gradually explored **Central** and **Southern America**, taking possession of the soil for their respective sovereigns. The civilisation of **Mexico** and **Peru** disappeared before the European thirst for gold and silver, and the native races were reduced to slavery or savagery. By the end of the seventeenth century America was held by the following European nations:

Spain possessed **Mexico**, **Central America**, parts of **North America**, with most of the **West Indies**, and all **South America** except **Brazil**.

Portugal possessed **Brazil**.

France possessed the banks of the river **St. Lawrence** and the southern part of the valley of the **Mississippi**.

England possessed the east coast of **North America** from **Florida** to **French Canada**. That part of the coast where **New York** now is was held by the Dutch till 1664, when it was seized by the English.

Great changes have taken place since, and most of the countries of America are now independent States with republican governments.

Population: about 160 millions.

NORTH AMERICA

Comparison with South America.—1. **Shape.**—(a) Each continent is triangular, with the widest part in the north and pointing towards the south, while the north coast is bordered by an archipelago.

(b) The west coast is steeper, longer, and less indented than the east coast.

(c) The east has many miles of double coast-line, formed by long, narrow islands and peninsulas, with narrow lagoons or channels separating them from the mainland.

2. **Surface.**—(a) The main ridge of mountains runs from north to south through the entire length, much nearer to the west than to the east. These mountains (**Cordilleras**) are called the **Rocky Mountains** (or **Rockies**) in North America, and the **Andes** in South America. In the east of North America the **Appalachian** or **Alleghany Range** corresponds to the mountains of **Brazil** near the Atlantic coast.

The distance of the Rockies in the United States from the Pacific allows room for intervening ranges—viz. **Sierra Nevada**, **Cascade**, and **Coast Ranges**.

(b) The long slope to the east forms immense plains, in which are many great river basins which bear a general resemblance. Thus the **St. Lawrence** corresponds with the **Amazon** in direction;

the Mississippi with the **La Plata**; the **Ori-noco** with the streams flowing into **Hudson Bay**.

3. **Differences.**—South America has no rivers corresponding with the **Mackenzie** and **Yukon** (which resemble the great rivers of Siberia), with the **Fraser** and **Columbia**, flowing over the western plateau of North America, or with the **Southern Colorado** of the United States.

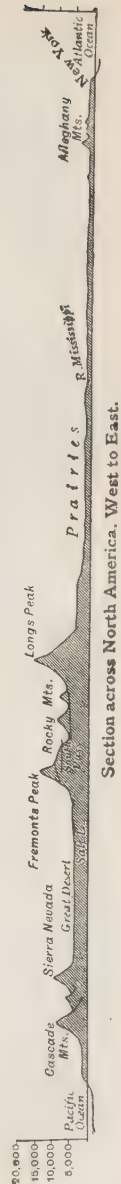
GREAT REGIONS.—North America contains four great Regions distinguished from each other by their position and physical features.

1. **The great Northern Region** lying north of the great lakes, bounded by the Rocky Mountains on the west, and stretching northward to the Arctic Ocean. This region is a flat plateau, and the land slopes gradually to the north. It is a region of grassy plains in the south and forests in the north: of great lakes drained by slow-moving rivers to Hudson Bay or the Arctic Ocean. Its climate is severe in winter, but so warm in summer that in all the southern part of this vast region wheat, barley, and oats come to perfection and enormous crops are raised.

2. **The Basin of the Mississippi and Missouri:** a region lying in the centre of the continent, drained by these great rivers and the countless streams that join them. It is a land of elevated plains crossed by low hills, and of broad rivers that afford waterways into the heart of the country. Its climate shows great range of temperature, but owing to warm dry summers, a fertile soil, and sufficient rainfall, enormous crops of maize and wheat are produced in the northern and central parts, and crops of cotton, tobacco, sugar, and rice in the south. The western part also contains large areas of grazing land, upon which cattle are raised.

3. **The South-Eastern Region.**—This embraces the region of the River St. Lawrence and the wonderful series of great lakes which it drains, the mountain ranges of the eastern States, and extends to Florida, and the lowlands along the northern shores of the Gulf of Mexico. A region extending over so many degrees of

FIG. 220.



latitude necessarily has a great range of climate and vegetable productions. The presence of great deposits of coal and iron combined with abundance of water-power has led to the growth of manufactures of many kinds, and the whole region is thickly populated.

4. **The Mountain Region of the West.**—This comprises the country crossed north and south by the long ranges and mountain masses of the Rockies. It contains forest lands, fertile valleys, and also large stretches of desert. Its rivers have cut deep courses or canyons on their way to the sea, but those that discharge into the Pacific have rapid courses and are of little use for navigation.

BOUNDARIES.—North America is bounded on the north by the **Arctic Ocean**, west by the Pacific, east by the Atlantic.

SIZE. — The area, including **Greenland** and the **Arctic Archipelago**, is nearly $9\frac{1}{2}$ millions of sq. miles, or the mainland alone about 8 millions of sq. miles.

Greatest breadth, about 3,100 miles.

Greatest length, from **Cape Barrow** to **Panama**, about 4,300 miles.

RELIEF.—Broadly speaking, North America is divided into a **Western Plateau** region and an **Eastern Lowland**, with elevations of secondary importance. Taking 100° W. long. as the dividing line, nearly all the surface to the west is a plateau elevated to a height of 2,000 ft. or more above the sea ; while to the east most of the surface is lowland.

The great North American **Plateau** occupies **Alaska**, and sweeps round in a south-east direction, gradually widening and attaining its greatest width between lat. 40° and 50° N., then narrowing towards **Mexico** and **Central America**, which are almost entirely filled with highlands. The greatest heights are reached in **Alaska**, where **Mount Logan** is 19,539 ft., and in **Mexico**, where **Popocatepetl** and **Orizaba** are about 18,000 ft. This plateau rises gradually from about 100° W. long. in a westerly direction to a great ridge, which, under the name of the **Rocky Mountains**, stretches through the whole continent of North America. West of the Rockies the plateau maintains a great height (average height 5,000 ft.), with many ranges running parallel from north to south upon it, and it slopes steeply to the **Pacific**.

The chief of these ranges are the **Coast and Cascade Ranges**, and the **Sierra Nevada** in the extreme West, the **Wahsatch Range** between those Ranges and the Rockies, and the **Sierra Madre**, in the west of **Mexico**.

FIG. 221.—NORTH AMERICA: RELIEF.



The great plateau is remarkable for dryness and extremes of temperature.

Secondary Elevations.—The **Appalachian** or **Alleghany** system stretches for about 900 miles from north-east to south-west in the east of the United States, with an average elevation of 2,500 ft. and a greatest height of 7,000 ft., forming the water-parting of streams flowing east to the Atlantic and west to the Mississippi. The **Labrador Plateau** divides the **St. Lawrence** river system from that of the rivers flowing into **Hudson Bay**.

PLAINS.—Vast plains lie between the **Rockies** and **Appalachian** Mountains. Between the **Rockies** and 100° W. long. these bear the name of the **Great Plains**, and consist in the United States of rolling treeless **Prairies**, very gradually descending to the lowlands of the **Mississippi Basin**.

The **Eastern Lowlands** lie between the **Appalachians** and the edge of the **Prairies**, forming the basin of the great **Mississippi System**.

In the extreme north of **British North America** are extensive low-lying lands, similar to the **toundras** of Northern Russia and **Siberia**.

Adjoining the northern part of the great plateau is a wide **forest region**, which extends southward towards the United States, and joins the northern extension of the **Prairies**.

The **Northern Lowland** region extends southward beyond the United States boundary, forming the basin of the **Red River** and **Lake Winnipeg**.

The **Atlantic Slope** descends very gradually to the sea from the **Appalachian Mountains**, and is joined in the south to the **Lowland Plain**.

RIVERS.—The rivers of North America are numerous and mighty, and hence the name **Land of Rivers**. They can be grouped according to their direction as follows:

(a) To the Atlantic: **St. Lawrence**, **Connecticut**, **Hudson**, **Delaware**, **Susquehanna**, **Potomac**, **James**, and many others.

(b) To the Gulf of Mexico: **Mississippi**, **Alabama**, **Rio Grande del Norte**, and **Trinity**.

(c) To the Pacific: **Colorado**, **Sacramento**, **Columbia**, **Fraser**, and **Yukon**.

(d) To the Arctic: **Mackenzie**, **Coppermine**, and **Great Fish**.

(e) To **Hudson Bay**: **Severn**, **Nelson**, **Churchill**.

(f) The continental rivers of the **Great Plain**, which do not reach the sea.

(c) The great system of lakes drained by the St. Lawrence—viz. Superior, Huron, Michigan, Erie, and Ontario.

Besides these there are many small lakes in the North-eastern States to the south of the St. Lawrence, Lake Champlain being the chief. There are numerous lakes in the State of Minnesota, draining into the Mississippi.

Also on the Great Plateau are many salt lakes, of which **Great Salt Lake** is the largest.

There are also some lakes in Mexico.

COAST LINE.—In the west the coast is generally steep, with deep water coming up close to the land. In the north and east the coasts are generally low, with the **100-fathom line** a considerable distance from the shore, and with many long and narrow islands and peninsulas separated from the mainland by lagoons, thus forming a double coast-line.

The east coast, especially north of Cape Cod, is much indented. In the west, to the north of **Puget Sound**, the coast is much broken, but the only large opening to the south is the **Gulf of California**.

In extent of coast-line compared with area, North America is next to Europe, which is the most indented in the world.

CAPES.—Cape Farewell, at the south of **Greenland**. Cape Race, on **Newfoundland**. Cape Cod, near **Boston**, close to which the Pilgrim Fathers landed. Cape Hatteras, in **North Carolina**. Cape Sable, at the extremity of **Florida**. Cape San Lucas, at the extremity of Lower California. Point Concepcion, Cape Mendocino, in the west of the United States. Cape Prince of Wales, the most westerly point. Cape Barrow, the most northerly point.

SEAS AND OPENINGS.—Hudson Bay, in the north, is of vast extent and icebound most of the year. Baffin Bay, between **Greenland** and the **Arctic Archipelago**. Gulf of St. Lawrence, with the estuary of the St. Lawrence. Bay of Fundy, between **Nova Scotia** and **New Brunswick**. Gut of Canso, between Cape Breton Island and **Nova Scotia**. Gulf of Mexico, with **Campeachy Bay**. Caribbean Sea, with the **Bay of Honduras**. Gulf of California. Bay of San Francisco, **Puget Sound**, **Nootka Sound**, in **Vancouver Island**. Behring Sea, between **Alaska** and **Siberia**.

STRAITS.—Behring Strait, between **Alaska** and **Siberia**. Queen Charlotte Sound, Strait of Georgia, and Juan de Fuca Strait, between **Vancouver** and **British Columbia**. Yucatan Channel, between **Yucatan** and **Cuba**. Florida Channel, between **Florida** and **Cuba**. Long Island Sound, between **Long Island** and the mainland. Belleisle Strait, between **Newfoundland** and

Labrador. **Hudson Strait**, leading into Hudson Bay. **Northumberland Strait**, between Prince Edward Island and the mainland. **Davis Strait**, leading into Baffin Bay. **Smith Sound**, between the coast of Greenland and **Grinnell Land**.

ISLANDS.—The **Arctic Archipelago**, including **Cockburn Land**, **Melville Island**, **Banks Land**, **Bathurst Island**, **Prince Albert Land**, and **Victoria Land**.

The islands in the **Gulf of St. Lawrence**—viz. **Newfoundland**, **Prince Edward**, **Cape Breton**, **Anticosti**, **Miquelon**, &c.

Bermuda Islands. **Long Island**, near New York.

The **Pacific Islands**—viz. **Vancouver**, **Sitka**, **Queen Charlotte Islands**, **Prince of Wales**. **Aleutian** and **Pribilof Islands**.

CLIMATE AND RAINFALL. (a) Throughout North America (except Mexico and Central America) great extremes of temperature are experienced.

Causes.—1. The great extension of the continent to the north and south.

2. The absence of a range of mountains from east to west to bar cold northern or hot south winds. A study of the Isotherm maps will show the great range from north to south of summer heat and winter cold.

(b) The western coast is of higher average temperature than the east. See January Isotherm map on p. 459.

Causes.—1. The prevalence of warm western winds from the Pacific.

2. The existence of a polar current on the east.

3. The general direction of the great mountain system causes it to act as a barrier to prevent the cold winds from reaching the western region.

(c) The rainfall is generally abundant on the west coast, in the lowland plains east of 100° W. long., and along the Atlantic Slope. It is scanty in the Plateau region, in places between the Rockies and the Western Mountain ridges—*e.g.* the **Mohave Desert** in California—with large districts in Texas and Montana, extremely so.

Causes.—1. The moist west winds bring the rain to all the coast north of 40° N. lat. as far as Alaska, where it is very heavy. See Rainfall maps on p. 458.

2. The east winds from the Atlantic and the Gulf of Mexico bring much moisture to the Eastern States and the Lower Mississippi basin.

3. The height of the western ridges, **Sierra Nevada**, &c., condenses most of the moisture before the clouds pass over to the eastward.

Local Peculiarities.—1. 'Hot or cold waves' are common and sudden and may extend over great distances. The cold winds are known as **Blizzards**.

2. Cold winters extend far to the south. Even in the Gulf States (30° N.) frost is not uncommon, and the cotton shrub has to be planted annually.

3. Excessive heat and cold on the Desert Plateaux, owing to the height and dryness.

4. Very violent winds, called tornados, are experienced in the great plains, causing much destruction.

FIG. 224.—NORTH AMERICA: WINTER RAINFALL:
DECEMBER TO FEBRUARY.



after Supan

Emery Walker & Co.

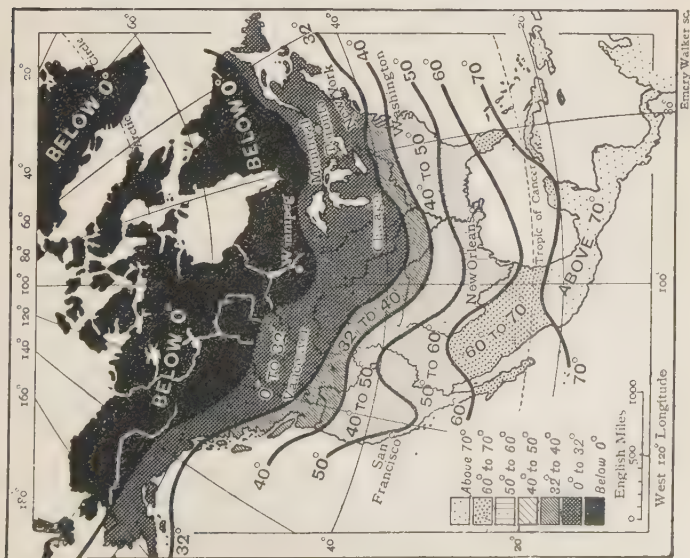
FIG. 223.—NORTH AMERICA: SUMMER RAINFALL:
JUNE TO AUGUST.



after Supan

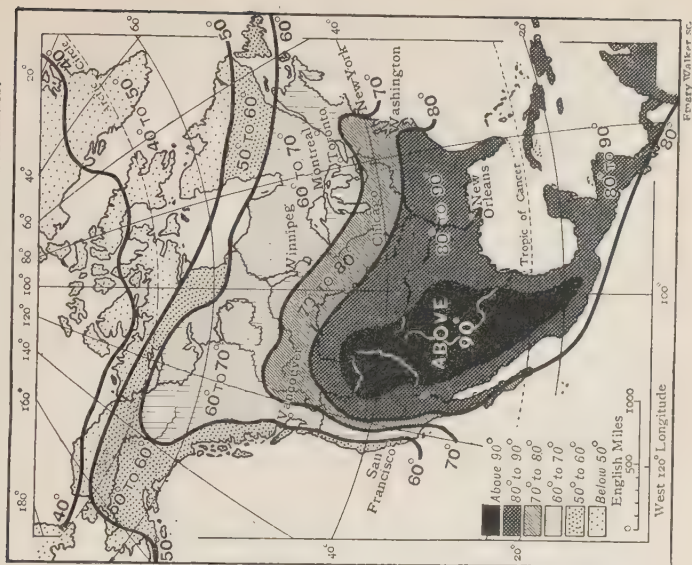
Emery Walker & Co.

FIG. 225.—NORTH AMERICA: JANUARY ISOTHERMS.



Emery Walker &c.

FIG. 236.—NORTH AMERICA: JULY ISOTHERMS.



Emery Walker &c.

5. The atmosphere is generally very bright and clear, owing to the dryness of the winds that sweep over the continent from the west.

Comparison with the Old World.—1. As in the Old World, the west coast is warmer than the east, from causes stated above.

2. The west of Europe is warmer than the west of North America.

3. The east of North America is warmer than the east of Asia.

PRODUCTIONS.—1. **Vegetable.**—The flora of North America ranges from Arctic to tropical plants.

Native Plants.—Tobacco, maize, potatoes, cotton, vine, with numerous trees, such as firs, pines, cedars, hickory, oak, maple, &c., are some of the most important. All important plants of the Temperate Zone have been imported and flourish—*e.g.* wheat and other cereals; sugar-cane, coffee, &c.

2. **Animal.**—North America once abounded in wild animals, but they have not been tamed, the domestic animals being the same as in Europe. The native animals are the **fur-bearing** animals, such as beaver, seal, &c.; buffaloes; the elk tribe; deer; animals of prey, such as panthers, lynxes, and wolves. In Central America and Mexico are numerous monkeys and other tropical animals.

Birds are very numerous. Humming and other tropical birds, pigeons, ducks, geese and turkeys, eagles, &c.

Fish.—Very abundant and valuable, both in salt and fresh water. Salmon in the Pacific rivers; cod, mackerel, &c., on the eastern shores; shad and white fish in the eastern rivers and lakes; oysters.

3. **Mineral.**—North America is very rich in almost every kind of mineral. In the Western Plateau and mountain region the precious metals **gold** and **silver** abound, while in the Lowlands **coal** and **iron** are found over wide areas. Copper, quicksilver, petroleum and natural gas, salt, &c., are widely spread.

PEOPLE.—About 130 millions. Natives and Negroes, with many mixed races; whites of European extraction.

The Natives of North America have the general name of Indians, but there was a considerable difference in the civilisation and manners of those in Mexico and Central America as compared with those of the United States and Canada when discovered by Europeans, the latter being very much more fierce and strong. In Mexico and Central America, Indians number six millions, and half-breeds four millions, out of a total of thirteen millions. In the United States the Indians are mostly restricted to **reservations**, and number 237,000, while in Canada they roam as hunters over a vast region.

In the United States are 11 millions of coloured people—*i.e.* Negroes and half-breeds. The chief Europeans are the British, German, and French, in the United States and Canada; Spanish in Central America and Mexico. All European nations are represented in the United States.

FIG. 227.—NORTH AMERICA:
DENSITY OF POPULATION.

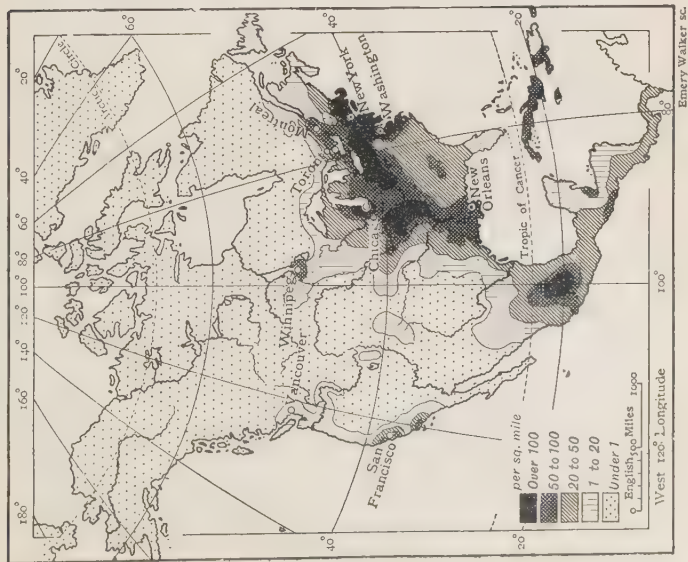
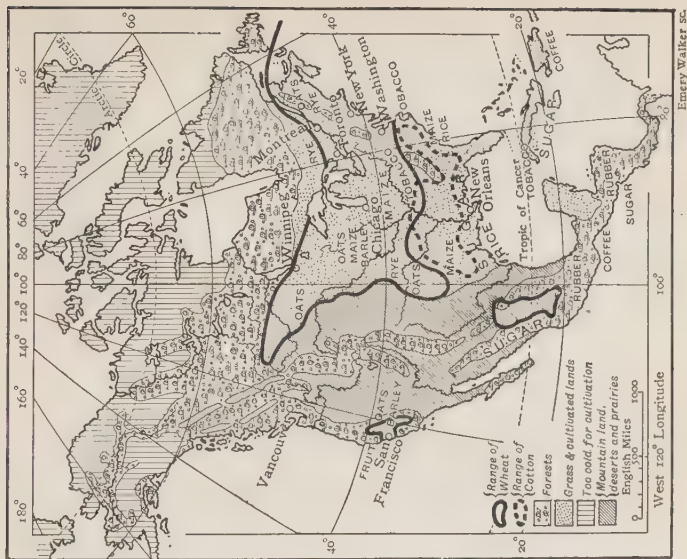


FIG. 228.—NORTH AMERICA:
VEGETATION AND VEGETABLE PRODUCTS.



THE COUNTRIES IN NORTH AMERICA, WITH THEIR CAPITALS

<i>Country</i>		<i>Capital</i>
The Dominion of Canada	} British North America	Ottawa
Newfoundland		St. John's
The Bermudas		Hamilton
The United States		Washington
Mexico	} States of Central America	Mexico
Guatemala		Guatemala
San Salvador		San Salvador
Honduras		Tegucigalpa
Nicaragua		Managua
Costa Rica		San José
Panama		Panama
British Honduras		Belize

EXAMINATION PAPERS

- A. 1. Give an account of the discovery of America by Europeans.
2. Make a general comparison of the shape of North America with that of South America.
3. Describe the western elevated part of North America.
4. Name six conspicuous capes of North America, indicating their position.
- B. 1. Show how the relief of the surface and the contours of the coast of America resemble the great land mass of the Old World.
2. State the various drainage areas of North America, and name the chief rivers. Show how the general direction of the great rivers is determined.
3. Describe the climate of North America, stating the chief causes affecting it.
4. Name the principal native and imported plants of North America.
- C. 1. Show the position of the great lowlands of North America, giving any distinctive names and describing any striking peculiarities.
2. Describe the coast-line of North America, and name the chief seas and openings.
3. Name the various races of people inhabiting North America, and show, as far as possible, their relative importance and numbers.
4. State some remarkable facts connected with the climate of North America, and account for them as far as possible.
- D. 1. Examine the summer isotherm of 60° and explain its great range to the north.
2. Follow the course of the winter isotherm of 32° and explain its great range to the south.
3. What are the conditions of rainfall and climate that are suitable for the growth of wheat in Western Canada?
4. What are the physical conditions that have caused the eastern and middle parts of the United States to be the most densely populated parts of North America?

FIG. 229.—BRITISH NORTH AMERICA.



Longitude West 100 of Greenwich

Longmans & Co. London & New York.

Walker & Bonallie

BRITISH NORTH AMERICA

POSITION.—British North America comprises all North America to the north of the United States except Alaska and Greenland. It includes the Dominion of Canada and the island of Newfoundland.

The **Dominion** consists of the provinces of **Quebec**, **Ontario**, **Nova Scotia**, including **Cape Breton Island**, **Prince Edward Island**, **New Brunswick**, **Manitoba**, **British Columbia**, with **Vancouver Island**; also the new provinces of **Alberta** and **Saskatchewan**, formed in 1905 from the districts of **Alberta**, **Athabasca**, **Assiniboia**, and **Saskatchewan**. There are also the large districts of **Keewatin**, **Yukon**, &c.

Newfoundland forms part of British North America, though it is not a part of the Dominion.

BOUNDARIES.—**South.**—From the **Pacific Ocean** to the **Lake of the Woods**, the boundary is 49° N.; then through **Rainy Lake** and **River** to **Lake Superior**; next the middle line of **Lakes Superior**, **Huron**, **Erie**, and **Ontario**, and of the river **St. Lawrence** to lat. 45° N., where it passes to the south of the **St. Lawrence** and touches the **New England States**.

West.—The **Pacific Ocean**. **North.**—The **Arctic Ocean**. **East.**—The **Atlantic Ocean**.

AREA.—About 3,650,000 sq. miles.

RELIEF.—An irregular line from the mouth of the **Mackenzie** to the **Red River** divides British North America into two portions, the western part being elevated and the eastern part mostly lowland.

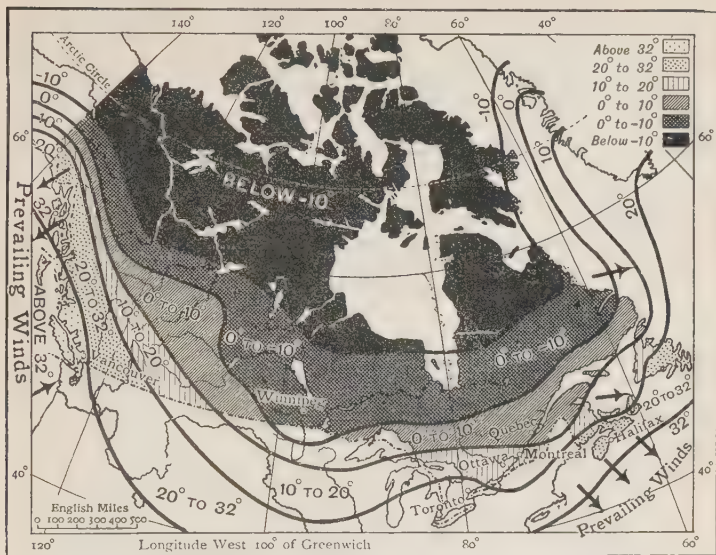
In the **Western** division are, first, a gradual slope to the summit of the **Rockies**, and, next, a high plateau region with a sharp descent to the **Pacific Ocean**.

The **Lowland** division consists of barren, bleak toundras towards the **Arctic Ocean** and **Hudson Bay**; next a broad belt of forest land stretching from **Alaska**, in the north-west, to the **Great Lakes** in the south-east; and, lastly, low-lying rich plains between **Lake Superior** and the **Rockies**.

In the east and south-east is the elevated land which fills much of **Labrador** and almost all the province of **Quebec**, and forms the watershed between the **Hudson Bay** system of rivers and the **St. Lawrence** system.

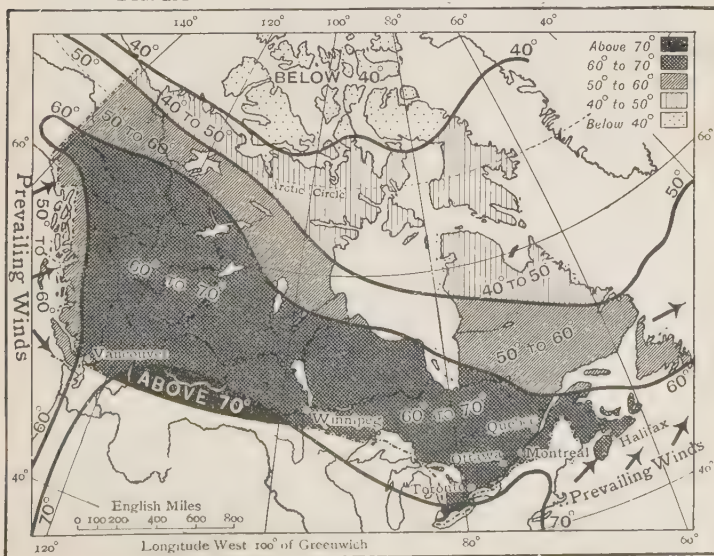
The **Mountain System** consists of numerous parallel chains running north-west and south-east, of which the chief are the **Rockies**. The **Selkirk Range** lies a little to the west of the **Rockies**, and the **Cascade Range** lies near the **Pacific Coast**.

FIG. 230.—BRITISH NORTH AMERICA: JANUARY ISOTHERMS



Emery Walker sc.

FIG. 231.—BRITISH NORTH AMERICA: JULY ISOTHERMS



Emery Walker sc.

The chief summit in the **Rocky Mountains** is **Robson Peak**, 13,700 ft., and there are many other peaks between 11,000 ft. and 13,000 ft.

PASSES.—The **Rocky Mountain Passes** are lower in British North America than in the United States; and hence the Canadian Pacific Railway was constructed with less difficulty than the great southern lines, and has the advantage of less snowfall. The chief Canadian Passes are **Kicking-horse Pass**, 5,200 ft., and **Rogers Pass**, 4,300 ft.

PLAINS.—1. The toundras of the North.

2. The **Forest Plains** from **Alaska** to the **Great Lakes**.

3. The low **Plain of Manitoba**.

4. The **Rolling Treeless Prairies**, west of Manitoba to the **Rocky Mountains**.

COMPARISON WITH THE UNITED STATES.—In its division into a **Western Plateau** and an **Eastern Lowland**, British North America resembles the United States; but the elevated portion is wider in the latter than in the former country. The **Appalachian** mountain system in the East has a parallel to some extent in the **Plateau of Labrador**.

CLIMATE AND RAINFALL.—(a) Generally speaking, the west has a higher temperature than the east.

(b) The general temperature is lower than that of Europe in the same latitude. The January isotherm of 40° is much farther north in Europe (see maps on p. 465).

(c) The difference between winter cold and summer heat is very great—*e.g.* the July isotherm of 80° extends to the northern parts of the United States, but much of the same district lies between the isotherms of 30° and 40° in the winter.

(d) The snowfall is remarkably heavy in the east, and diminishes in amount towards the Rockies.

Local Causes which affect the Climate of British North America:

1. The western winds on the Pacific slope raise the temperature and cause a considerable rainfall along the coast; thus the isotherm of 60° makes a great bend to the north along the west coast.

2. The cold polar current in the east lowers the temperature in the coast provinces. This is seen by tracing the course of the isotherm of 32° from Newfoundland to northern Europe.

3. The absence of a great mountain range lying from east to west gives free play to the cold northern and also to the hot southern winds, and causes the climate to be remarkably uniform over many degrees of latitude; *e.g.* even so far south as lat. 43° N. the average snowfall is 57 inches. On the other hand, the summer heat is so great that wheat will ripen as far north as 60° N. lat.

RIVERS.—1. The **St. Lawrence** drains the **Great Lakes** of North America, and has a course of 700 miles from **Lake Ontario** to the sea. From the source of the **St. Louis**, which flows into **Lake Superior**, the entire length is 2,000 miles. This includes the **Sault St. Mary** River, between **Lakes Superior** and **Huron**; the **Detroit** River and **Lake St. Clair**, between **Huron** and **Erie**; and **R. Niagara**, between **Erie** and **Ontario**.

The basin of the **St. Lawrence** is defined by the **Labrador Plateau** on the north and by the **Appalachians** on the south. Many tributaries join the main stream, of which the chief are the **Ottawa** on the left, and **Richelieu** from **Lake Champlain** on the right. The channel is wide, and expands into a magnificent estuary. Above **Montreal** the stream is rapid, and navigation is impeded by numerous islands and rapids; but the latter are avoided by a canal. The whole river system affords a splendid waterway from the **Gulf of St. Lawrence** to the centre of North America, considerable vessels being able to pass the whole distance along the lakes and by canals, avoiding the rapids. The chief Canadian towns on this river and its connected lakes are **Toronto**, **Hamilton**, and **Kingston** on **Lake Ontario**, **Montreal** on an island in the main stream, **Ottawa** on the river **Ottawa**, **Quebec** on the left bank.

2. The **Arctic River System** includes the **Mackenzie**, **Coppermine**, and **Great Fish** Rivers.

The **Mackenzie** drains a vast area, and carries off the surplus waters of **Great Slave**, **Great Bear**, and **Athabasca** Lakes. **Lake Athabasca** receives the rivers **Athabasca** and **Peace**. The **Mackenzie** discharges an immense volume of water into the **Arctic Ocean** during the summer, but it is frozen over for about three-quarters of each year in its lower course.

3. The **Hudson Bay River System** includes the **Nelson**, **Churchill**, and **Severn**.

The **Nelson River** drains **Lake Winnipeg**, and so carries to the sea the waters of the river **Saskatchewan**, which drains the greater portion of the provinces of **Saskatchewan** and **Alberta**. **Lake Winnipeg** also receives the **Red River of the North**, which rises in the **United States**, and flowing north is joined by the **Assiniboine River**. The **Nelson** is impeded by falls about 100 miles from its mouth.

4. In the **Pacific System** of Rivers the chief is the **Fraser**, which drains the plateau, and descends by many falls to the sea. Hence it is of small use in navigation; but its valley for many miles has been used as the route of a railway.

LAKES.—The Canadian Lakes are in three groups, agreeing with their drainage slope:

1. The Great Lakes drained by the **St. Lawrence**.
2. The Lakes draining into **Hudson Bay**.
3. The Lakes draining into the **Arctic Ocean**.

1. The **Great Lakes** are **Superior** (32,000 sq. miles in area and 600 ft. above sea-level), communicating with **Lake Huron** by the River and Falls of **Sault St. Mary**, which are avoided by a canal on the Canadian and American

side. **Huron** (about 24,000 sq. miles in area and 580 ft. above sea-level). With this lake is connected **Michigan**, which is entirely in the United States (25,600 sq. miles in area, and at the same level).

Huron communicates with **Erie** (9,600 sq. miles in area and 570 ft. above sea-level), by the short river **St. Clair**, **Lake St. Clair**, and **Detroit River**. The waters of **Lake Erie** flow into **Ontario** (7,500 sq. miles in area, and 245 ft. above sea-level). Between **Erie** and **Ontario** is the **Niagara River**, 33 miles long, which falls over a cliff 150 ft. high, forming the famous **Falls of Niagara**. The river at this point is one-half of a mile wide, and the volume of water is enormous. The **Welland Canal** has been constructed to enable vessels to pass between **Lakes Erie** and **Ontario**.

These Great Lakes are inland seas with violent storms, and are navigated by many large vessels, which carry on a great trade.

2. The chief of the numerous lakes which drain into **Hudson Bay** are **Winnipeg**, **Winnipegosis**, **Manitoba** and **Deer Lakes**, and **Lake of the Woods**.

3. The chief of the lakes draining into the **Arctic Ocean** are **Athabasca**, **Great Slave**, and **Great Bear Lakes**. All these lakes are frozen over in winter.

FERTILITY OF SOIL.—A vast extent of soil bordering on the **Arctic Ocean** and **Hudson Bay** is sterile, and has too cold a climate to produce crops. The fertile land lies near the **St. Lawrence**, especially in the lake peninsula between **Huron**, **Erie**, and **Ontario**; in **New Brunswick**, **Nova Scotia**, and **Prince Edward Island**; and in **Manitoba**, **Alberta**, **Saskatchewan** and other districts, where the soil is extremely fertile and produces heavy crops of wheat and other cereals, with potatoes, &c. To the north of this last-named district is a great forest region which extends from **Alaska** across the continent in a south-easterly direction to the Great Lakes and the river **St. Lawrence**. **British Columbia** has not a very large area of fertile land, but possesses large and valuable forests.

PRODUCTS.—**British North America** is mainly an agricultural country and during recent years has been rapidly developed in the west. Vast areas of fertile land have been broken up and planted with wheat and other cereals. In 1922 about 38 millions of acres of land were under oats and wheat respectively. Wheat is chiefly grown in the west and oats in the east.

The chief crops are:—**Wheat**, **oats**, **barley**, **potatoes**, **rye**, **buckwheat**, and **apples**; the **vine** and **tobacco** in the **Eastern States**.

Other vegetable products are **timber**, which is widely diffused, especially **fir** and **pine**, and after wheat forms the most valuable export. **Grass**, on the western prairies near the **Rockies**, where cattle are reared in increasing numbers. **Sugar** is produced from the juice of the maple-tree.

1. **Animal**.—**Cheese** is manufactured in large quantities for export. **England** receives more cheese from **Canada** than from any other country. **Cattle**, **sheep**, and **horses** are reared in large

numbers, and cattle and sheep are exported. Many animals, as the sable, ermine, mink, fox, and wolverine, still exist in the forests, and are hunted for their furs. **Fur-bearing** seals are killed on the Labrador coast. **Fish**, from salt and fresh water, is a very valuable product. **Cod** on the **Banks of Newfoundland**. **Herring**, **lobsters** and **mackerel** in the **Gulf of St. Lawrence**. **White fish** in the lakes. **Salmon** in the **Fraser River**. The total value of the product of the fisheries of the **Dominion** was (1921) nearly £7,000,000, while that of **Newfoundland** was over £4,000,000.

2. **Mineral**.—The mining industry in British North America is steadily growing in importance. In 1921 the value of the mineral produce was over 36 million pounds sterling. The chief minerals are coal, nickel, gold, petroleum, asbestos, copper, silver, and iron. The chief mining districts are in **Nova Scotia**, **British Columbia**, **Quebec**, **Ontario**, and part of the **North-West Territories**. Nickel exists at **Sudbury**, in **Ontario**, in enormous quantities. Gold is found in the **Klondyke** district in the **Yukon Territory**, where **Dawson City** is the chief mining settlement.

MANUFACTURES.—These are being rapidly developed.

Iron and **leather** goods are manufactured, and some exported.

Flour, **pulp**, and **timber** mills are numerous.

TRADE.—The great natural resources of British North America cause trade to be actively carried on. The various products of the soil, the mines, and the fisheries are exchanged for manufactured goods, tropical produce, articles of luxury, &c. Canada possesses a large mercantile marine, many of the ships being employed upon the great lakes. The chief shipping province is **Nova Scotia**.

MEANS OF INTERNAL COMMUNICATION.—By river, lake, and canal, Canada has excellent water communication, and possesses about 39,000 miles of railway. In the summer, light canoes of birch bark pass along the rivers and lakes, and are carried across the intervening portions of land, called 'Portages.' In this way goods are conveyed for very great distances. The longest line of railway is the **Canadian Pacific**, from **Montreal** to **Vancouver**, a distance of 2,906 miles, which brings Japan and China four days nearer to England than by the **Suez Canal** route. **Yokohama** can be reached from **Liverpool** in twenty-one days. A railway is contemplated from **Winnipeg** to a port on **Hudson Bay**.

Canals.—Numerous short canals have been constructed to avoid the rapids and falls of the **St. Lawrence**. The chief are :

1. The **Welland Canal**, connecting **Lakes Erie** and **Ontario** and avoiding the **Niagara Falls**.

2. The **Bideau Canal**, connecting **Ottawa** with **Kingston** on **Lake Ontario**.

3. The **Sault Ste. Marie Canal**, connecting **Lakes Superior** and **Huron**.

FOREIGN TRADE.—Imports.—Iron and steel (in all their forms), woollen and cotton manufactures, coal and coke, sugar and tea.

The imports are mainly from the United States, the United Kingdom, and the West Indies.

Exports.—Wheat and wheat flour, wood and wood pulp, cheese, cattle, bacon, fruits.

The exports are chiefly to the United States, United Kingdom, West Indies, and Brazil. Wheat and flour. Animals, chiefly cattle, and cheese, bacon, butter, fruits, &c., are exported in increasing quantities, especially to the United Kingdom.

with U.S.A. £160 millions.

with U.K. £80 mills.

£4 *with France.*

with Germany £1¼ mills.

FIG. 232.—
BRITISH NORTH
AMERICA: TRADE
WITH OTHER
COUNTRIES, 1921.

PORTS.—Montreal (618), Quebec (95), Toronto (521), Hamilton (114), Halifax (58), St. John (N.B.) (47), Victoria (38), Vancouver (117). Others are St. John's (Newfoundland), Sydney (Cape Breton Island), and Pictou (Nova Scotia).

Montreal, on an island in the St. Lawrence, is at the head of navigation for large ocean steamers, as the canals only admit vessels of less than 12 ft. draught. Montreal is blocked by ice for five months annually.

Quebec, formerly the chief port of Canada, has lost ground by the deepening of the river and the making of canals. It is still the place of arrival and departure of passengers.

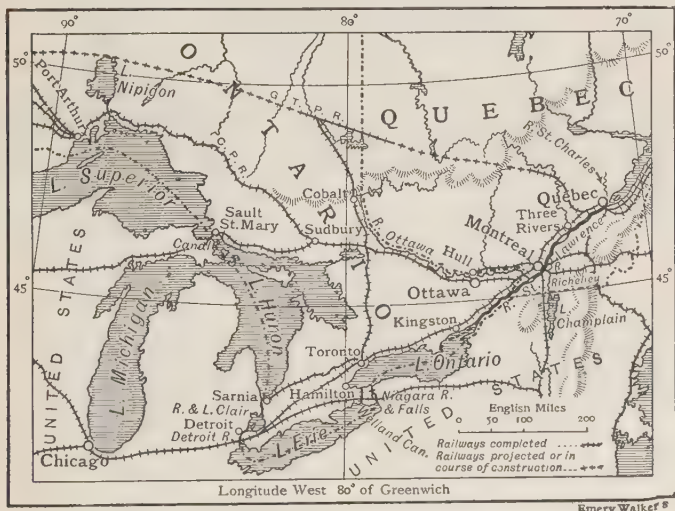
Halifax is the winter port for the Dominion.

Toronto is a great and rapidly-increasing port upon Lake Ontario, and **Hamilton** is an important port upon the same lake. **Sarnia**, at the mouth of the river St. Clair, is a town of some importance. **Port Arthur**, on the northern side of Lake Superior, is the point where the Canadian Pacific Railway touches the lake. **Victoria** is at the south-eastern extremity of Vancouver Island, and **Vancouver** is a port at the Pacific terminus of the Canadian Pacific Railway. **Nanaimo** is on Vancouver Island. It is a new but thriving seaport. **Esquimaux**, two miles from Victoria, is the British naval station on the Pacific. **Port Nelson**,

on Hudson Bay, will be of considerable importance when the railway from Winnipeg is completed, as this is the shortest route to Liverpool.

PROVINCES AND TOWNS.—1. **Quebec**, area 706,800 sq. miles, with a population of 2,300,000, most of whom are French, and live near the St. Lawrence on both sides of that river, but especially on the narrow southern slip. The chief occupation is lumbering, but there is now some manufacture of iron, coal being obtained from Nova Scotia. The interior of the province has many lakes and great forests, but the winters are very cold and the population scanty.

FIG. 233.—ONTARIO AND QUEBEC.



Quebec (95), the capital, was founded by the French, and was the chief city of French Canada and strongly defended. It was taken by the English under General Wolfe in 1759. The city is situated at the foot and on the summit of the precipitous left bank of the St. Lawrence.

Montreal (618), on an island in the River St. Lawrence, is the largest city in the Dominion, and is rapidly growing. It is connected with the right bank of the river by a railway bridge, nearly two miles long. **Three Rivers** is a town on the left bank of the St. Lawrence, between Quebec and Montreal.

2. **Ontario**, area 407,000 sq. miles, with a population of over 2,900,000, extends to the west of Quebec along the north of the Great Lakes. It stretches farther south than any other part of the Dominion, and has a less rigorous climate than Quebec. The capital and largest town is **Toronto** (521).

Ottawa (107), on the river **Ottawa**, is the seat of government of the Dominion, and carries on an extensive trade in lumber. **Hamilton** has already been referred to with the ports.

3. The Gulf Provinces.—**Nova Scotia** (the old French 'Acadie'), with **Cape Breton Island**, **New Brunswick**, and **Prince Edward Island**.

FIG. 234.—THE GULF PROVINCES.



Walker & Boutall's

Longmans & Co. London & New York.

Nova Scotia, area 21,000 sq. miles, has coal and other minerals and important fisheries. About one-half of the soil is fertile. The **Vale of Annapolis**, near the **Bay of Fundy**, has a favourable climate and is famous for apples. Population, 523,000.

Halifax (58), the capital, upon a good harbour, is almost always free from ice in the winter, and is the terminus of an important railway. This port is the head-quarters of the British Navy in North American waters. A British garrison is maintained in the fortress of Halifax.

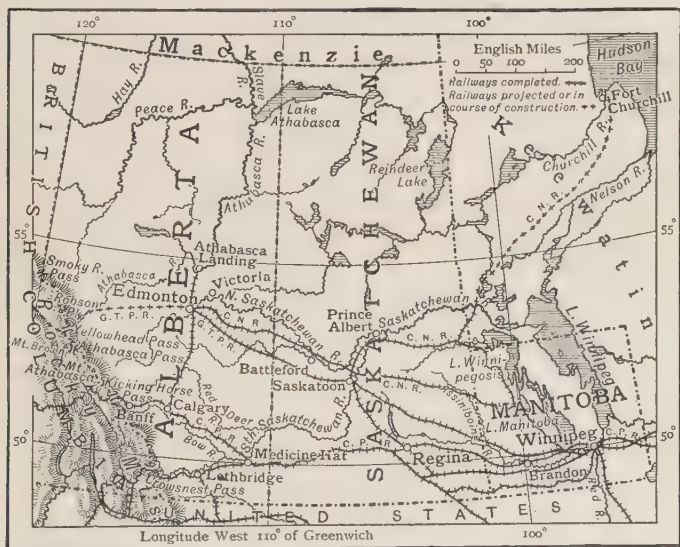
Other towns are **Pictou**, a port upon the eastern end of Northumberland Strait, **Sydney** and **Louisbourg** in Cape Breton Island. The latter was captured by the British from the French in 1758.

New Brunswick, area 27,900 sq. miles, a hilly province on the south of the St. Lawrence, has valuable forests and fisheries.

St. John (47), upon the river St. John, and **Fredericton**, the capital, upon the same river, are the chief towns.

Prince Edward Island, area 2,000 sq. miles, is separated from the mainland by **Northumberland Strait**, which is annually frozen. The capital is **Charlottetown**.

FIG. 235.—ALBERTA, SASKATCHEWAN, AND MANITOBA.



4. **Manitoba**, area 251,800 sq. miles, and population about 610,000, is a flat wheat-growing province west of **Lake Superior**, forming the basin of the **Red River**, and including the greater parts of **Lakes Winnipeg** and **Winnipegosis**. The capital and largest town is **Winnipeg** (179), at the junction of the **Red** and **Assiniboine Rivers**.

5. The provinces of **Alberta** and **Saskatchewan**, formed in 1905 out of the districts of **Alberta**, **Athabasca**, **Assiniboia**, and **Saskatchewan**, the districts of **Keewatin**, **Yukon**, &c.

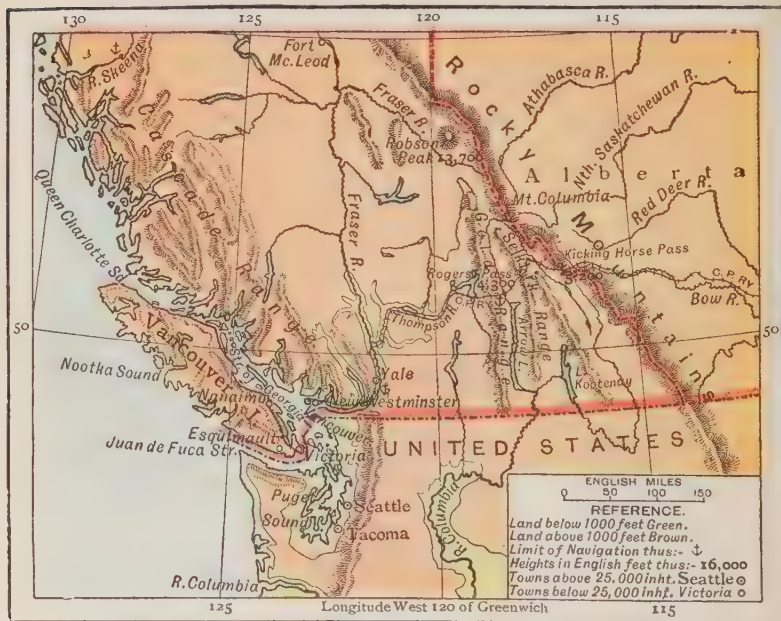
Keewatin is a large district between **Manitoba** and **Ontario** and stretching to **Hudson Bay**, and under the rule of the **Lieutenant-Governor of Manitoba**.

6. **British Columbia**, including **Vancouver Island**, nearly 355,000 sq. miles in area, with about 500,000 inhabitants, consists of the **Western Plateau**, which is very dry, and a mild, rainy

coast region. The chief products are **minerals** (gold, silver, and coal), and **timber** (pine, fir, cedars, and giant sequoias), from the great forests clothing the slopes of the **Cascade Mountains**.

The capital is **Victoria** (38), on Vancouver Island. The other chief towns are **Vancouver** and **New Westminster**, to each of which the Canadian Pacific Railway runs.

FIG. 236.—BRITISH COLUMBIA, &C.



Longmans & Co. London & New York

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RAILWAYS.—1. The **Canadian Pacific Railway**, from Montreal through Ottawa, Winnipeg, Regina, and Calgary, over the Rocky Mountains by Kicking-Horse Pass and Rogers Pass to Vancouver.

2. The **Grand Trunk Railway**, from Montreal through Toronto to Detroit, and thence to Chicago.

Line Projected.—From Winnipeg to a port on Hudson Bay.

POPULATION.—Over 8½ mills. The population is densest in Prince Edward Island, where it is 43 to a sq. mile; Nova Scotia, 23 to a sq. mile; and Ontario, 10 to a sq. mile. In British Columbia it is about one person to a sq. mile. In the Arctic Islands and territories there is about one person to 25 sq. miles.

THE PEOPLE.—Over five-sixths of the people are natives of British North America, and the majority of these are of British extraction, though a large number are French, especially in the province of Quebec. Of other Europeans, the numbers are inconsiderable as compared with the United States, the majority of immigrants in the Dominion being from the United Kingdom. Indians number about 108,000, and live in the north-west and other thinly-settled districts upon the produce of the chase. They are not confined to reservations, as is generally the case in the United States.

GOVERNMENT.—The Constitution of the Dominion is like that of the United Kingdom in principle. The chief authority is vested in the British Sovereign, who appoints a Governor-General, and he is assisted by a Privy Council formed of the chief Ministers of State. There are two Houses of Parliament—viz. the Senate and the House of Commons. The Senators are nominated for life by the Governor-General from the various provinces, in proportion to their population. The House of Commons is elected by the people, and may sit for five years. Members of both Houses receive an allowance in proportion to their attendance. Each province is governed by a Lieutenant-Governor and either one or two Houses, with a responsible ministry.

Esquimaux and Halifax are both strongly fortified and garrisoned by Canadian troops.

NEWFOUNDLAND.—This island, area 42,000 sq. miles, lies at the mouth of the Gulf of the St. Lawrence, and is separated from the mainland by the **Strait of Belleisle**, and from Cape Breton Island by **Cabot Strait**. Its shores are rocky and remarkably indented. The interior is undulating, with pine forests and barrens, varied by fertile valleys in which are numerous rivers and lakes. The climate is severe in winter, and is affected by a cold polar current which causes dense fogs to prevail during much of the year. The population is about 259,000, of whom a very few are Indians, and nearly all the others are white natives of the island. The main occupations are **fishing** for cod and lobsters, **hunting** seals, **mining** for copper and iron, **lumbering**, and a small but increasing tillage. The **exports** are cod and other fish, cod and seal oil, lobsters, seal-skins, copper ore and iron pyrites, chiefly to Great Britain, British West Indies, Canada, United States, Brazil, and Portugal.

The **imports** are flour and provisions generally, manufactured woollens, cotton, canvas, &c., and tropical produce from Great Britain, Canada, British Colonies, and the United States.

The island is a self-governing Colony, being governed by a Governor, with a Council and two Houses of Parliament, of which one is elected. The capital is **St. John's**. The religion is mainly Protestant, but over one-third are Roman Catholic.

BERMUDAS.—These are a group of 360 small islands, of which about twenty are inhabited, with an area of 20 sq. miles,

lying 580 miles east of North Carolina, and 677 miles south-east of New York. They are noted for their fine climate and scenery, and are a favourite winter resort of Americans. The islands form a British Colony under a Governor, with a Council and a representative House of Assembly.

The population numbers 20,000, of whom two-thirds are Negroes. The chief products are onions, potatoes, and lily bulbs, which are mostly exported to the United States. The chief town is **Hamilton**.

EXAMINATION PAPERS.

- A. 1. State the composition of the Dominion of Canada, naming the chief town in each province.
2. Describe the river St. Lawrence, with sketch-map, including the five great lakes.
3. Describe the climate of Canada, stating the local causes which produce differences in the same latitudes.
4. Name the fertile districts of the Dominion and the chief crops, distinguishing between general and local products.
- B. 1. Give the causes of the intense cold of winter of the northern part of British North America.
2. Explain why along the west coast the summer is so much cooler than places in the interior in the same latitude.
3. What are the conditions that cause the country between 50° and 60° N. lat. to be so suitable for the growth of wheat?
4. Compare the winter and summer climate of Winnipeg with that of London and give the causes of the great differences.
- C. 1. Describe the lake systems of the Dominion of Canada, naming the chief lakes and the rivers draining them.
2. Name the chief ports, describing their position and the nature of their commerce.
3. Draw a sketch-map, marking the chief railways, with the most important towns through which they pass.
4. How is the Dominion governed—(1) as a whole, (2) in its various divisions?
- D. 1. Name the rivers of the Dominion, and describe the Mackenzie and Nelson, pointing out any disadvantages from which they suffer.
2. Name the chief animal products of the Dominion, indicating the localities in which any of them are especially abundant.
3. Say what you can of the position of the following, and state any interesting facts connected with them:—Welland Canal, Kicking-Horse Pass, Robson Peak, Quebec, Toronto, Calgary, Vancouver, Acadie, Louisburg, Hamilton.
4. Give a brief description of Newfoundland, drawing, if possible, a sketch-map, including the Gulf and Estuary of St. Lawrence.

THE UNITED STATES

POSITION AND BOUNDARIES.—The United States of America (U.S.A.) occupy all North America south of the Dominion of Canada and north of Mexico. The country is bounded on the

North by lat. 49° N. from the **Pacific Ocean** to the **Lake of the Woods**, then through **Rainy Lake** and **River** to **Lake Superior**, next the middle line of **Lakes Superior, Huron, Erie, and Ontario**, and of the river **St. Lawrence** to lat. 45° N., where the boundary passes to the south of the **St. Lawrence** and touches the **New England States**, terminating at the **Bay of Fundy**. **East** by the **Atlantic**. **West** by the **Pacific**. **South**, by the **Gulf of Mexico**, the **Rio Grande del Norte**, and a line passing through the **Gila Depression** and terminating at **San Diego Bay**.

Alaska, the great territory in the north-west of the continent, belongs to the United States, by purchase from Russia.

SIZE.—Area of the United States, over 3,000,000 sq. miles; and in addition **Alaska**, over 500,000 sq. miles.

Only the British, Russian, and Chinese Empires are larger.

Greatest length from east to west, about 2,900 miles.

Greatest breadth from north to south, about 1,900 miles; average breadth about 1,200 miles.

RELIEF.—The surface consists of—(a) a great highland region in the west; (b) a lesser highland in the east; (c) a vast intervening lowland; (d) a smaller lowland district between (b) and the Atlantic.

Taking 100° W. long. as the dividing line, the great bulk of the surface to the west is above 2,000 ft. in average height; while to the east nearly all the surface is below that height.

The mountains have a general direction from north to south, and lie in parallel chains, with but few cross ranges. Hence, the main drainage is from the two highland regions inwards to the river Mississippi.

From the Mississippi the **lowlands** extend to the east and west, gradually rising between 95° and 100° west in the rolling plains called the **Great Plains** to the edge of the **Rocky Mountains**, and on the eastern side to the **Appalachian** mountain system. From the **Rocky Mountains** a vast **Plateau** of great elevation (average height 5,000 ft.) extends almost to the Pacific Ocean, having in the extreme west the **Cascade, Sierra Nevada, and Coast Ranges**, and crossed from north to south by many mountain chains, in places 15,000 ft. in height. These mountain chains divide the plateau into a series of detached portions with many different characteristics, but alike in being very dry and having great extremes of temperature.

The **eastern highland** region is of much less extent, and of lower elevation. The average elevation is 2,500 ft., and the highest point is 7,000 ft.

MOUNTAIN RANGES.—The mountains of the west have the general name of **Cordilleras**, and form part of the great mountain system that stretches from Behring Sea to Cape Horn.

The **Rocky Mountains** are the highest ridge and most continuous chain, having many peaks between 14,000 ft. and 15,000 ft. high, of which **Pike's**, **Long's**, and **Gray's Peaks** are conspicuous. Further west and diverging to the south is the **Wahsatch Range**, which divides the plateau into the **Great Basin** and the **Colorado Plateau**. The western portion of the plateau is bordered by the **Sierra Nevada** and **Cascade Mountains**, with many lofty peaks; **Mount Whitney** (15,000 ft.) in the former, the highest in the United States¹; **Shasta** and **Tacoma** (or **Rainier**), each about 14,500 ft., in the latter. The **Coast Range** lies near the Pacific Coast from Puget Sound to Mexico.

The loftiest mountain in North America is **Mt. Logan**, 19,539 ft.

The **Appalachian Mountain System** resembles the Cordilleras in having a general arrangement of parallel chains running north and south, enclosing a central valley, which is here continuous from **Canada** to **Alabama**. The system has many ranges, of which the **Adirondacks**, **Green** and **White Mountains** in the north, and the **Catskills** in the central portion, are the most important.

The highest portion of the system is in the south, where **Black Dome** reaches a height of 6,707 ft., and the lowest is in the central portion.

Lying between the Mississippi and the Western Plateau is a system of hills of low elevation—viz. the **Ozark Mountains**.

PLATEAUX.—The Great Plateau is in three main parts—viz.

1. The **Columbia Plateau** in the north-west, having the **Cascade Mountains** in the west, the **Rockies** in the east, and a low ridge in the south forming the watershed between the **Snake**, a tributary of the **Columbia**, and the **continental rivers** of the **Great Basin**.

2. The **Great Basin** lies between the **Sierra Nevada** and the **Wahsatch Range**, with the mountains of Southern California on the south. This is a remarkably dry region, the rainfall being almost everywhere insufficient for agriculture. Numerous salt lakes exist, of which the largest is **Great Salt Lake**, and these receive the scanty continental rivers. This basin contains some remarkable depressions called **Sinks**, of which the **Death Valley**, near the **Mohave Desert**, is 225 ft. below the sea-level. These sinks are extremely hot and dry.

3. The **Colorado Plateau** lies east and south-east of the **Great Basin**. This plateau is furrowed by deep valleys called **Cañons**, through which flow the river **Colorado** and its tributaries. These valleys or gorges are all due to the action of streams, which, in the course of ages, have worn away their beds to the depth of several thousand feet below the general level of the surface. The most famous gorge is the **Grand Cañon**, 7,000 ft. deep.

¹ Except peaks in Alaska.

FIG. 237.—THE UNITED STATES: PHYSICAL.



Further Remarkable Formations and Phenomena of the West of the United States.—(a) The **Yellowstone National Park**, in North-west **Wyoming**, is a region abounding in hot springs and geysers, which in some cases discharge boiling mud. Several rivers take their rise here—viz. the **Missouri**, **Snake**, and **Yellowstone**. The last-named flows through the **Yellowstone Cañon**, which is 1,000 ft. deep.

(b) The **Yosemite Valley** in the **Sierra Nevada**, famous for its great falls, and the rocks of great height and strange shape.

(c) The **Mesas**, flat-topped mountains in **New Mexico** and along the **Rio Grande**, covered with ancient lava, which has preserved the surface from the action of water. These mesas were the refuge of the aboriginal races from the attacks of savage Indians, and here they constructed the cliff dwellings which still remain.

PLAINS.—1. The portion of the Western Highland region to the east of the Rockies is called the **Great Plains**, which lie between the main ridge of the Rockies and 100° W. long., where the average elevation of 2,000 ft. has its limits. The surface is rolling, with wide river valleys. In the south, in **Texas** and **New Mexico**, are the **Staked Plains** or **Llano Estacado**. In **Nebraska** is a large region of **Sand Hills**.

2. The **Eastern Lowlands** lie between the Great Plains on the west and Appalachians on the east, and form the central and main portion of the Mississippi Basin, the northern boundary being the **Height of Land** in Minnesota.

The northern part of this lowland embraces the **Prairie Region**, the best wheat-growing land in the United States. On each side of the Mississippi the land for wide stretches is below the river level, and artificial banks, called **levees**, have been constructed to retain the stream in its bed. This lowland joins the Atlantic Slope round the southern end of the Appalachians.

3. The **Atlantic Slope** is very low along the coast, with great swampy districts in **Florida**, **Georgia**, **North Carolina**, and **South Carolina**. Towards the north, in **New England**, the land is more hilly, and the soil rocky.

STRAITS AND OPENINGS.—**C. Cod Bay** (where the Pilgrim Fathers landed in 1620). **Long Island Sound**, between that island and the mainland. **New York Harbour**, receiving the R. Hudson. **Delaware Bay**, a deep inlet receiving the R. Delaware. **Chesapeake Bay**, an opening of great extent. **Pamlico** and **Albemarle Sounds**. **Strait of Florida**, between Florida and the Bahamas and Cuba. **Mobile Bay** and the mouth of the **Mississippi**, in the Gulf of Mexico. **San Francisco Bay** in the west, a deep, wide inlet with two large branches. The entrance is called the **Golden Gate**. **Mouth of the R. Columbia**, **San Diego Bay**, and **Puget Sound**, with a great length of coast line, being much indented.

ISLANDS.—**Nantucket** and **Martha's Vineyard**, off the coast of Massachusetts. These islands have a fine healthy climate. The chief occupation is fishing.

Long Island approaches very close to New York in its south-west extremity, and helps to form New York Harbour. The large city of Brooklyn, upon Long Island, is connected with New York by a great suspension bridge. The outer coast of the island has many summer resorts for the people of New York and neighbouring cities.

CLIMATE AND RAINFALL.—1. The summers are hotter and the winters colder than corresponding latitudes in Europe. Thus New York, which is 10° farther south than London, has a much colder winter and hotter summer.

2. The west coast has less extremes than the east, owing to the action of warm winds in the west and of cold currents in the east. This can be clearly seen by studying the direction of the summer isotherms of 60° , 70° , and 80° , and the winter isotherms of 32° , 40° , and 50° (see maps on p. 482).

3. Rainfall is generally sufficient to the east of 100° W. long., but insufficient over most of the region to the west of that line.

4. The whole country is liable to very sudden and great changes of temperature known as **Hot and Cold 'Waves.'**

LOCAL CAUSES.—1. The absence of any great mountain range lying east and west either in the north or south. Hence, the cold northern and hot southern winds make themselves felt over very great distances.

2. The influence of the south-westerly winds and the warm water of the **Gulf Stream** is felt along the Atlantic coast from **Florida** to **C. Hatteras**; and, hence, there is a great difference between the winter of that coast and that of New York, which is but little further to the north and comes under the influence of the **polar current**.

3. The extreme **western mountains** receive the rainfall from the **Pacific**; and, hence, the great plateau is very dry.

RIVERS.—The rivers of the United States are divisible into the following systems:

1. The **St. Lawrence System**.

2. The **Atlantic System**, draining the Atlantic Slope. The **Connecticut**, **Hudson**, **Delaware**, **Susquehanna**, **James**, **Savannah**, and **Potomac**.

3. Those flowing into the Gulf of Mexico—viz. **Alabama**, the **Mississippi**, **Rio Grande del Norte**, **Colorado**, and **Trinity**.

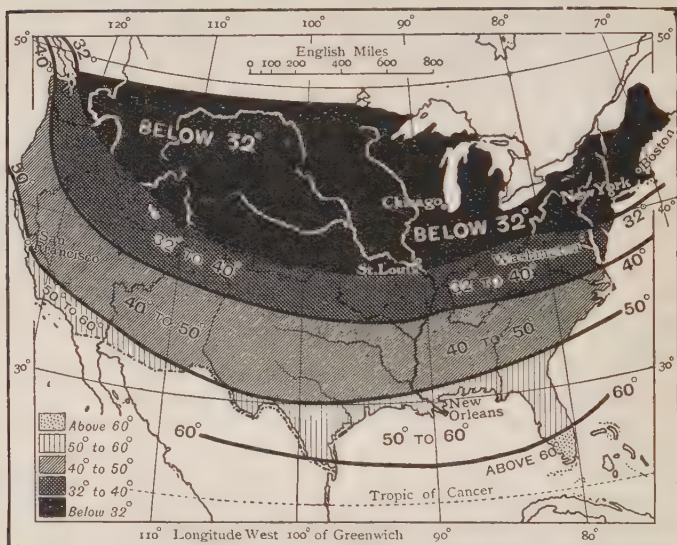
4. The **Pacific System**, the **Colorado**, **Sacramento**, and **Columbia**.

5. The **Continental Rivers** of the Great Plateau.

6. The **Red River of the North**, draining into Hudson Bay.

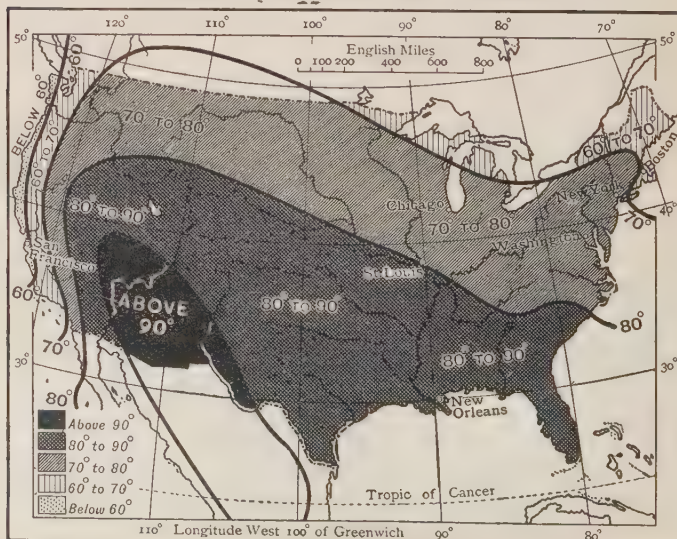
1. The **St. Lawrence** has already been described in the chapter on British North America. This system is of great importance to the United States, because of its great length of navigable waters. This river receives the

FIG. 238.—UNITED STATES: JANUARY ISOTHERMS.



Emery Walker sc

FIG. 239.—UNITED STATES: JULY ISOTHERMS.



Emery Walker sc

drainage of the numerous lakes in the North-eastern States. Many of the chief towns are near the confluence of the tributaries with the Great Lakes or the St. Lawrence itself.

2. The chief rivers of the **Atlantic System** are all of relatively moderate length (average about 400 miles), but all form good harbours at their mouths and are navigable for considerable distances; while the descent from the high land has generally produced falls where the convenient water power has led to the creation of many busy towns.

FIG. 240.—THE MISSISSIPPI VALLEY.



Walker & Boutwell sc.

Longmans & Co. London & New York

The **Hudson** (325), the most important of these rivers, rises in the **Adirondacks**, and flows almost due south, its valley forming a most convenient trade route for railways and canals. The depression in which the Hudson flows turns west at **Troy**, forming the **Mohawk Valley**, in which is the **Erie Canal**, affording direct water communication between **Buffalo** on Lake Erie and the Hudson River. At the mouth of the Hudson stands **New York**, the largest city in the New World.

3. The **Mississippi** rises in the **Height of Land** in **Minnesota**, receiving the drainage of the numerous small lakes of that region, and after a course of 2,400 miles reaches the Gulf of Mexico. Its greatest tributary is the **Missouri**, whose source is over 4,000 miles from the sea. The **Missouri**

loses much by evaporation in its course over the plains, and is of less volume at its confluence than nearer to its source. The chief tributaries on the right bank are the **Missouri**, which receives the **Yellowstone**, **Platte**, and **Kansas**, the **Arkansas**, and **Red River**. On the left is the **Ohio**, which receives the **Cumberland**, **Tennessee**, and **Wabash**. The **Ohio** is 1,300 miles long, and affords an excellent waterway through states rich in mineral and vegetable produce. The chief towns on this river are **Pittsburg** and **Cincinnati**. The **Lower Mississippi** is peculiarly subject to floods, being higher than the level of its valley; and its waters have to be confined within artificial banks called **Levees**. This valley is remarkable for its fertility. A little below the confluence of the **Missouri** stands **St. Louis**, where there is a great railway bridge. Hence, **St. Louis** is a great railway and commercial centre. In its lower course the **Mississippi** gives off many branches which enclose tracts of land, called **Bottoms**, of great productivity. The chief of these are the **Yazoo** and **Tensas Bottoms**. At its mouth the **Mississippi** forms a **Delta**, which by the great deposit of sediment is continually extending into the Gulf of Mexico. The chief mouth has been deepened by the construction of walls which narrowed the stream and caused it to scour away the sediment. **New Orleans**, a great seaport, is reached through this mouth by large vessels.

The **Rio Grande del Norte** (Great River of the North), 1,400 miles long, flows from the Great Plateau, and affords navigation for a considerable distance inland.

4. The **Colorado**, 840 miles, drains the plateau of that name, and passes through the great cañon regions, receiving on its left the **R. Gila**. It is navigable for 500 miles.

The **Sacramento**, 420 miles, drains the valley between the **Sierra Nevada** and the **Coast Range**, receives the **San Joaquin** from the south, and enters **San Francisco Bay**. The valley of this river is remarkable for its fine climate and many productions.

The **Columbia**, 750 miles, drains a vast region in the north-west, but suffers in volume from the scanty rainfall. It has numerous falls, which supply ample water-power. The chief tributary is the **Snake**.

5. The **Continental Rivers** of the Great Plateau are all of small volume and of little consequence, except in irrigation. The chief are the **Bear** and the **Jordan**, flowing into **Great Salt Lake**.

Many of these streams disappear under the lava beds.

6. The **Red River of the North** flows northward through a remarkably level plain and reaches **Lake Winnipeg**. Other streams rising in the United States also form part of the **Hudson Bay** system of rivers.

FERTILITY OF SOIL.—Generally speaking, the fertility varies with the elevation of the surface. Thus, on the **Great Plateau** the soil is very sterile, much of it being saline or alkaline in character and producing only sage-brush. Only about one per cent. of the plateau is at present cultivated. The **Great Plains** produce grass, and are suitable for the rearing of cattle. The valleys of the **Lower Mississippi** and of the **Ohio** are remarkably fertile, as is also the slope of land east of the **Mississippi**, including **Florida** and the **Eastern States** northwards as far as **New York**. The **New England States** contain a considerable

extent of stony land, requiring much labour to make it productive. The great **Prairies** included between the **Ohio** and the **Mississippi** are all productive. Other fertile districts are the valleys of the **Sacramento** and **Columbia**. The **Colorado** is too far below the surface of the surrounding country to be of use in irrigation.

PRODUCTS.—1. **Agricultural.**—The chief crops in order of their value are **corn** (maize), **wheat**, **oats**, **hay**, **cotton**, **barley**, **potatoes**, **rye**, **sugar**, **tobacco**, **buckwheat**. The cereals are grown in almost every state, in greater or lesser quantities.

Others of importance are **sugar**, **fruit**—viz. apples, peaches, &c.—in the Northern Atlantic States; oranges, grapes, &c., in Florida and California; rice, flax, and hemp.

The eastern half of the United States may be divided into three belts of production—viz. the **Cotton Belt**, the **Corn Belt**, and the **Wheat Belt**, those crops being most important in the districts so designated, though all are very widespread and overlap each other to a considerable extent.

The bulk of the land in the United States is farmed by its owners. The chief **corn**-growing (maize) states are Illinois, Kansas, Iowa, and Missouri.

Wheat is most largely grown in Kansas, Minnesota, California, North Dakota, Ohio, and other states in the Mississippi Basin.

Cotton is chiefly grown in Texas, Georgia, Mississippi, Alabama, South Carolina, and Arkansas.

2. **Forest Products.**—Timber covers about one-third of the country, and lumber is a very valuable product for home consumption and for export. Some of the chief forests are on the **Appalachians** and the **Cascade Mountains**, and in the states south of the **Great Lakes** and the **St. Lawrence**. The chief trees are firs and pines, cedars, hickory, walnut, and maple. The great lumber ports are **Seattle** and **Tacoma** on **Puget Sound**, **Pensacola**, on the **Gulf of Mexico** and **New York**. **Tobacco** is grown largely in Kentucky, Virginia, North Carolina, and Tennessee.

3. **Minerals.**—Exceedingly varied, widespread, and abundant. **Coal**, **iron**, **silver**, **gold**, **lime**, **petroleum**, **building-stone**, **copper**, and **lead**. Others are zinc, natural gas, tin, salt, and quicksilver.

Coal.—Various kinds abound—viz. anthracite, bituminous, cannel, and lignite. The coal-fields are very extensive, the chief being: 1. The **Alleghany** coal-field in Pennsylvania, Alabama, and Georgia. Here the coal is anthracite and bituminous. The chief town on this coal-field is **Pittsburg**. 2. **Illinois** coal-field. 3. **Missouri** coal-field.

Lignite exists in great quantities on the Great Plateau.

Iron-ore is very abundant, but is generally found at a distance from the coal, and the ore is, therefore, carried to the smelting districts. The ore is

chiefly mined in the **Lake Superior** district, in **Pennsylvania**, in **New York**, and in **Alabama**. The chief iron manufacturing town is **Pittsburg**, in **Pennsylvania**. **Birmingham**, in **Alabama**, stands in a rapidly rising district, where coal, iron, and lime are found close together. In the neighbourhood of **Puget Sound** there is also a combination of all three minerals, and the iron industry is springing up there. The United States produce great quantities of iron and steel goods, and export manufactured articles such as agricultural implements, machinery, sewing machines, &c.

Silver, gold, and quicksilver are mostly worked in the west—in **California**, **Nevada**, **Colorado**, and **Montana**.

Copper is most abundant in the **Lake Superior** district, on the **Keeweenaw Peninsula**, and on islands in the lake.

Mineral oil is abundant in **Pennsylvania**, **Ohio**, and the neighbouring states. It is also obtained in **California**.

Natural gas permeates the ground in **Pennsylvania**, **Ohio**, and **Indiana**. At **Pittsburg** this has largely taken the place of coal, and the change has saved a vast annual sum in fuel there. Its use has also cleared the atmosphere, so that the title of 'Smoky City' is no longer applicable to **Pittsburg**.

Salt is found on the surface and from the salt lakes of the deserts of the **Great Plateau**; in great beds in **Nevada**; from wells in **Michigan**, where most is produced; and from the lagoons on the Atlantic coast.

4. **Animals**.—The products of wild animals in the United States are now unimportant, except seal and other furs and seal oil in **Alaska**. Small wild animals are still numerous in the forests, but the bison is extinct as a free wild animal. The chief breeding-place of the seals is the **Pribylov Islands**, in **Behring Sea**.

Domestic Animals.—Cattle, sheep, and swine are very numerous, and from them are produced great quantities of cheese, butter, hides and skins, tallow and lard, wool, meat, &c. All these animals are of European extraction.

5. **Fisheries**.—Very valuable in the sea, the lakes, and the rivers. **New Bedford**, in **Massachusetts**, has whale fisheries. **Gloucester** is the chief port in the United States for the cod and other fisheries on the Banks of **Newfoundland**. Shad and other white fish are abundant on the Atlantic coast. The **Columbia River** abounds with salmon, the capture, canning, and export of which form a great industry.

MANUFACTURES.—The manufactures are mainly carried on in the North Atlantic and North Central States—viz. **New York**, **Pennsylvania**, **Ohio**, **Massachusetts**, **Illinois**, **Indiana**, and **Michigan**. The north-east is the chief manufacturing region, for several reasons.

1. Abundance of coal and iron easily obtained.
2. Plenty of water-power in the streams from the Appalachians.
3. These states have been long settled, and the soil is often not naturally very fertile. Hence the farmers cannot compete with the production of the great western farms, and there is much labour available for manufacturing industry.

Water-power is abundant and is largely utilised, especially on the Atlantic slope of the Appalachians. Steam-power is chiefly used to the west of these mountains. The most important of the very numerous manufacturing industries are :

Food Stuffs—viz. flour and other products of cereals, numerous animal and vegetable products, cooked and canned ; **steel and iron goods, clothing** (apart from the great spinning and weaving industries), **lumber** and its products, **cotton goods, leather and leather goods, woollen goods.**

Food Stuffs.—Flour-milling is mainly done where water-power is available—*e.g.* **Minneapolis**, where the **Falls of St. Anthony** furnish the requisite force ; **Rochester**, at **Genesee Falls**, near Lake Ontario ; **Spokane Falls**, on the Columbia River ; and on the **Willamette**, in Oregon. **St. Louis**, on the Mississippi, also produces much flour. **Meat-curing and packing** very important at **Chicago** and **Cincinnati**. **Fruit-canning** at **San Francisco**.

Steel and iron goods at **Pittsburg, Birmingham, Cleveland, and Denver**. **Clothing** at **New York, Philadelphia, Chicago, Boston, Cincinnati, and Baltimore**.

Lumber and wooden manufactures are very widespread.

Cotton goods are mostly manufactured in the northern states, but an increasing quantity is produced in the cotton-growing districts. The chief towns are **Lowell and Fall River**, in Massachusetts.

Leather goods at **Worcester and Lynn** in Massachusetts, **Newark** in New Jersey, and **Rochester** in New York.

Woollen goods chiefly at **Philadelphia**.

With the exception of food stuffs, the great bulk of the manufactured goods is consumed at home.

TRADE.—A vast internal traffic exists, and a large part of the total products are consumed in the country. The products are so varied and abundant that the country is able to supply its own wants to a very great extent. The foreign carrying trade is mostly in foreign vessels, but a large fleet of vessels are engaged in the coast and internal traffic. These are all native built, foreign vessels being excluded.

MEANS OF INTERNAL COMMUNICATION.—By rail, river, lake, and canal an excellent system exists. Roads are generally poor. In 1908, 232,000 miles of railway were in operation, forming a complete network. The chief railway centres are **New York, Chicago, St. Louis, Pittsburg, St. Paul, and Cincinnati**. The most important lines are :

1. The **Union and Central Pacific**, from **Chicago** to **San Francisco**, and from **New York** by **St. Louis** to **San Francisco**.
2. The **Northern Pacific**, from **Chicago** to **Puget Sound** and **Portland**.
3. **Southern Pacific**, from **New Orleans** to **San Francisco**, crossing the cañon country by wonderful engineering feats. In the United States generally, but especially in the west, the construction of railways has preceded and led to the cultivation of the soil by making it possible for produce to be conveyed to the great markets.

The Trans-Continental lines cross the Rockies at great heights, the **Union and Central Pacific** having over 1,200 miles at a height greater than 4,000 feet.

The rivers have a vast traffic by steamers and barges over thousands of miles of navigable streams.

Canals.—These, though numerous, are now generally diminishing in importance. The most important is the **Erie Canal**, from **Buffalo** to **Troy**, connecting the Great Lakes with the Hudson, and so with the Atlantic.

The chief inland trading centres are **Chicago**, **St. Louis**, **Minneapolis**, and **St. Paul**, **Cincinnati**, **Milwaukee**, **Omaha**, and **Kansas City**.

FOREIGN TRADE.—Imports.—**Sugar**, **coffee**, and **molasses**, **chemicals**, **hides**, and **skins**, **woollen goods** and **silk manufactures** form 35 per cent. of the total.

Others of importance are **iron and steel**, **raw and manufactured**; **flax and jute**, **raw and manufactured**; **tin plates and manufactured tin**; **fruits**; **wood**, and **manufactures of**; **raw india-rubber**; **raw silk**; and **tea**.

FIG. 243.—UNITED STATES: TRADE WITH OTHER COUNTRIES, 1921-22.

with U. K. £220 millions.

with B.N.A. £170 mills.

with Japan £110 mills.

with Germany £89m.

with France £75.

Exports.—**Raw cotton** (about one-sixth of the total value), **bread-stuffs and provisions** (**beef**, **bacon and hams**, **butter**, **cheese**, and **lard**), **iron and steel** and **manufactures of**, **mineral oils**, **animals**, **wood and manufactures of**, and **tobacco**.

Also **copper**, **manufactured cotton**, **leather**, **oil-cake**, **coal**, **forest products** (**resin**, **tar**, &c.), **chemicals**, **drugs**, **dyes**, and **medicines**, **fruits**, **seeds**, and **vegetable oils**.

The bulk of the trade is done with the **United Kingdom**, **Germany**, **British North America**, the **Netherlands**, and **France**.

The **United States** obtain from the **United Kingdom** **cotton goods**, **linen** and **woollen goods**, **iron goods** and **chemicals**, and **send cotton**, **wheat** and **flour**, **bacon**, **hams**, and **lard**, **cattle** and **meat**.

From **Germany**, **sugar**, **silks**, and **woollens**.

To **Germany**, **cotton**, **petroleum**, **tobacco**, and **lard**.

From **France**, **wine**, **precious stones**, **woollens**, and **silk**.

To **France**, **cotton**, **maize** and **petroleum**.

SEAPORTS.—In order of tonnage the six chief ports are: **New York** (population 5,600), **Boston** (748), **Philadelphia** (1,823), **Baltimore** (733), **New Orleans** (387), and **San Francisco** (506).

Walker & Boullist.



Other important ports are Portland (Maine), Mobile, Savannah, Charleston, Galveston, Pensacola, Portland (Oregon), and Tacoma.

New York has more of the foreign trade than all the others, having about 50 per cent. of the total.

The **Cotton Ports** are New Orleans, New York, Savannah, Charleston, Galveston, and Mobile.

Pensacola is a timber port. Portland (O.) exports wheat, and Portland (Me.) is a winter port for Canadian traffic.

Ports of the Interior.—**Buffalo** on Lake Erie, **Chicago** on Lake Michigan, **Duluth** on Lake Superior, **St. Louis** on the Mississippi.

POLITICAL DIVISIONS.—The United States comprise 48 States, 2 Territories, which are Alaska and Hawaii: the district of Columbia, in which is the capital, Washington (70 sq. miles).

The States vary in size, from **Texas**, 262,000 sq. miles, and **California**, 155,000 sq. miles, to **Delaware**, 1,965 sq. miles, and **Rhode Island**, 1,067 sq. miles.

The six north-eastern states—viz., Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island—are known as the New England States.

The States can be divided into **Atlantic** (subdivided into North and South), **Central** (also North and South), and **Western**. Such terms as Gulf States, Plateau States, Lake States, Pacific States, &c., are also used.

The **Atlantic** States are the most densely, and the **Western** States the most thinly populated.

TOWNS

Towns in Atlantic States.—These stand along the coast and on the rivers draining the Atlantic Slope, and are well situated for commerce.

New York (5,620 population according to census in 1910, with the connected cities of Brooklyn, Long Island City, Jersey City, Hoboken, and New Brighton), at the mouth of the Hudson, is the largest city in the New World, and the third seaport in the world. This city has very great commerce and manufactures. It is connected with Brooklyn on Long Island by a great suspension bridge. **Brooklyn** is really a suburb of New York, with great warehouses and manufactures, and is also the residence of many New York citizens.

Philadelphia (1,823), on river Delaware, at the confluence of the Schuylkill, is a city of very great extent, and has many manufactures.

Boston (748), on Massachusetts Bay, is well built, and is an important port with many manufactures. It is also the centre of learning in the United States.

Baltimore (733) is a port with important foreign trade on the **Patapsco Estuary**.

Buffalo (506), on Lake Erie, is a great lake port, with much trade in grain and timber, which is brought down the Great Lakes and thence by the Erie Canal and Hudson River, to New York.

Washington (437), in the **District of Columbia**, is the capital of the Union. The Government building is called the **Capitol**, and the President's residence the **White House**.

Newark (414) is an important manufacturing city, the chief industries being leather and jewellery.

Rochester (295), on the falls of the **Genesee**, has great manufactures of flour, &c., worked by water power.

Providence (237), in **Rhode Island State**, has boot and shoe, iron and textile manufactures.

New Haven (162) is the seat of **Yale University**.

Richmond, in **Virginia**, (171) is a manufacturing and commercial town, exporting much tobacco. This town was the capital of the South during the great Civil War, 1861-65.

Atlanta (200), the capital of **Georgia**, is a railway centre and manufacturing town.

Lowell, in **Massachusetts**, is a very important cotton-manufacturing town. **Charleston**, in **South Carolina**, and **Savannah**, in **Georgia**, are cotton ports. **Norfolk** has a very good harbour, and is an important naval port. **Augusta**, upon the river **Savannah**, has cotton manufactures worked by the fall of the river.

Towns in Central States, viz. those mainly to the west of the Appalachians and east of 100° W. longitude. These states form the main portion of the **Mississippi Basin**, and produce the bulk of the cotton, corn, wheat, and meat raised in the United States, as well as much other produce, both vegetable and mineral. Many large cities have sprung up at points where this produce can most easily be collected, prepared for the markets, and distributed.

Chicago (2,700), on the south-west of **Lake Michigan**, is the greatest centre for grain, flour, and cattle, the chief products of the Central and Western States. Much beef and pork are prepared and packed for distribution throughout the United States and for export. Chicago is at once the greatest railway centre in the world and a very important manufacturing city. It has grown from a population of 4,000 in 1837 to 2,185,000 in 1910, and can boast a more rapid progress than that of any other city in history.

St. Louis (772), on the **Mississippi**, just below the confluence with the **Missouri**, commands the commerce of the **Mississippi Valley**. It is a great centre for grain and provisions, and much flour is ground. Great trade is carried on by the rivers **Mississippi**, **Missouri**, and **Ohio**. This is a relatively old city, having been founded by French settlers in the eighteenth century.

Cincinnati (401), on the **Ohio**, is an important manufacturing city, and is the chief town in the **Ohio Valley**.

Cleveland (796), on **Lake Erie**, has important manufactures of iron and steel.

New Orleans (387), near the mouth of the **Mississippi**, is a great commercial port, being the outlet for the cotton, corn, flour, pork, &c., produced in the fertile river valley. The city is on a lower level than the surface of the river, and has to be protected by *levees*. Drainage of the city is, therefore, difficult, and outbreaks of epidemic disease are not infrequent. New Orleans was founded by the French, and there is still a strong French element in the people and language.

Pittsburg (588), at the confluence of the Allegheny and Monongahela Rivers, which combine to form the Ohio. The city has a great iron manufacturing industry, in which natural gas is used for fuel. The spot upon which **Fort Duquesne** stood is still shown. The British forces, under General Braddock, were defeated, and their commander killed here in 1755 by the French and their Indian allies.

Milwaukee (457), beautifully situated on the west of Lake Michigan, has a great German population. It is an important port with trade similar to that of Chicago.

FIG. 246.—THE GREAT LAKES



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Walker & Boutall sc.

Detroit (993), upon the river Detroit, exports grain and manufactures lumber.

Minneapolis (380) and **St. Paul** (234), upon the Mississippi, in Minnesota, are great commercial centres. The former town is especially famous for its great flour mills, worked by the Falls of St. Anthony. The fine flour, made from the hard wheat of the North-Western States, is largely exported to Europe.

Louisville (234), the capital of Kentucky, is a great tobacco market.

Omaha (191), upon the Missouri, in Nebraska, at the junction of the great Western railway lines, smelts silver and lead, and has much commerce, exchanging Western products for manufactured goods.

Kansas City (324), upon the Missouri, in Missouri, has similar trade to that of Omaha.

FIG. 247.—THE UNITED STATES: PHYSICAL AND POLITICAL.



Indianapolis (314), in Indiana, is a great collecting point for grain and cattle.

Allegheny (145), near Pittsburg, on the Ohio, has similar advantages and occupations.

Memphis is the lowest point at which the Mississippi is bridged, and sends much cotton down the river to New Orleans.

Mobile and **Galveston**, on the Gulf of Mexico, have an important export of cotton.

Towns in Western States (west of 100° W. longitude).

San Francisco (506), the chief city on the Pacific coast of America, has a splendid position, with much commercial and manufacturing activity. The city exports wheat and flour, salmon, fruits, &c. The climate is remarkably equable.

Denver (256), in Colorado, is the centre of a great silver and gold region.

Salt Lake City (118), the capital of Utah, has important manufactures, and is the centre of a productive irrigated district. This city was founded by the Mormons, and is the centre of Mormonism.

Los Angeles (576), near the coast, about 300 miles south of San Francisco, is situated in a district very productive of fruit, wine, and honey. The town has grown very rapidly, and is of great fame as a health resort on account of the dryness and salubrity of the climate.

Portland (258), in Oregon, exports timber, grain, fish, and wool, and has manufacture of wooden articles.

Seattle (315) and **Tacoma** (83) are rapidly rising seaports upon Puget Sound.

Sacramento, the capital of California, manufactures woollen goods, flour, sugar, and iron.

Spokane Falls, in Eastern Washington, is an important flour-milling town.

Leadville, in Colorado, **Boise City**, in Idaho, **Butte City**, in Montana, and **Virginia City**, in Nevada, are all mining towns.

POPULATION.—105,710,000 in 1920, with an average of 31 to the sq. mile, ranging from 566 in Rhode Island and 479 in Massachusetts, to less than one to the sq. mile in Nevada, and in Alaska 1 to about 9 sq. miles. (See map on p. 486.)

THE PEOPLE.—The great bulk of the people are of European extraction, the British being the chief. Of other European nations the Germans are the most numerous, and there are many Norse, Hungarians, French, Italians, and Swiss.

Coloured people (of pure or mixed Negro extraction) number about 11 millions. Native Indians number about 244,000, Chinese 161,000.

Chinese immigration is now forbidden.

GOVERNMENT.—The United States form a **Federal Republic**. Each State is a separate republic, with its elected Legislature and Governor, and has power to make laws affecting its own inhabitants. The Central or Federal Government has two houses forming the Congress, viz., the Senate and the House of Representatives, who are elected by the various States in proportion to their population. The **President** is chosen by electors representing the States, and retains his office for four years.

Alaska is a vast extent of country in the north-west, with an

area of 590,884 sq. miles, purchased from Russia in 1867. The country is watered by the river **Yukon**, a very mighty stream. The climate is very rainy and much milder than the same latitudes in the east. The products are timber, seal and other furs, salmon and other fish, and minerals. The capital is **Juneau** (3,300).

FOREIGN POSSESSIONS.—Porto Rico, **St. Thomas**, **St. Croix**, and **St. John** in the W. Indies, the **Philippines**, the **Ladrones**, and one of the **Caroline Group** in the Eastern Archipelago, taken from Spain in 1898. **Hawaii**, annexed in 1898. **Tutuila** and other **Samoa Islands**.

EXAMINATION PAPERS

- A. 1. Name the exact boundaries of the United States.
2. Give a general account of the elevation of the surface of the United States, indicating clearly the natural dividing lines.
3. Describe the Mississippi, drawing a sketch-map.
4. Describe and state position of Tacoma, Duluth, St. Louis, New York, Boston, Atlanta, Denver, Gila Depression, Mohave Desert, Yazoo Bottom.
- B. 1. Draw a sketch-map, inserting the various mountain ranges west of 100° W. long., and give some account of their relative importance and height.
2. Name the chief crops grown in the United States, and give some idea of the districts in which they are severally most important.
3. Where and what are the Mesas, Tensas Bottom, Rochester, Los Angeles, Portland, the Prairies, the Cordilleras, Shasta, Pensacola, Pittsburg?
4. Give a brief account of the government of the United States.
- C. 1. What are the causes of the severity of the winter in the northern parts of the United States?
2. A fertile soil, plenty of water, and a high summer temperature are necessary to the growth of cotton. What parts of the United States fulfil these conditions.
3. Follow the July isotherm of 70° from west to east, and explain its great variation as regards latitude.
4. The July and January temperature of New York ranges from 32° to 70°, whereas in San Francisco the range is only from 50° to 60°. Explain these differences.
- D. 1. Describe the Eastern Highlands of the United States.
2. Name the chief minerals of the United States, indicating the States or districts where each is abundant.
3. Name the chief rivers in the Atlantic Slope, and describe the Hudson.
4. Where and what are Pamlico Sound, Golden Gate, Martha's Vineyard, Buffalo, Wabash, Baltimore, Galveston, Detroit, Milwaukee?
- E. 1. Give an account of the Great Plateau, indicating the boundaries of its three chief divisions, and describing its general characteristics.
2. Describe the Yellowstone National Park and the Yosemite Valley.
3. Name the chief manufacturing industries of the United States, and connect each with some town or towns.
4. Name ten ports of the United States, indicating their position, and stating any trade especially connected with each.

- F. 1. Name the chief plains of the United States, indicate their position by reference to neighbouring mountains or rivers, and state any peculiarities of surface or soil.
2. Give an account of the railway system of the United States; name the chief railways and chief towns through which they pass.
3. Describe the Colorado River.
4. Where are Rainy Lake, Black Dome, Death Valley, Grand Cañon, Height of Land, the Adirondacks, Seattle, Keeweenaw Peninsula, Spokane Falls, Omaha, Providence, and Sitka?

MEXICO AND CENTRAL AMERICA

PHYSICAL

GENERAL DESCRIPTION.—Mexico consists of the greater portion of the gradually narrowing mass of land which extends in a south-east direction from the United States, and forms the connecting link between South America and the main portion of North America.

Where it touches the United States a breadth of about 600 miles is attained, but it narrows to 140 miles in the Isthmus of **Tehuantepec**, expands again into the great promontory of **Yucatan**, and finally narrows to 42 miles in the Isthmus of **Panama**. Between these two isthmuses the bulk of the country is occupied by the six republics which are known collectively as **Central America**.

The Isthmus of Panama is included in the **Republic of Colombia**, in South America.

BOUNDARIES.—**North.**—The **Rio Grande** and the **Gila Depression** westward to the Pacific. **East.**—The **Gulf of Mexico** and the **Caribbean Sea**. **West.**—The **Pacific Ocean**.

RELIEF.—The Great Plateau of the United States extends into Mexico, leaving only a small strip of low coastland on either side, with generally a very steep ascent from the plain to the plateau. Mountains border the plateau, and in many cases render access to the plateau extremely difficult. Of the two great peninsulas, that of **California** consists of a plateau bordered with lowland; that of **Yucatan** is generally low, and contains the greatest extent of lowland in the country.

The plateau is of great elevation, the most populous portion, viz. the **Plateau of Anahuac**, being 7,500 ft. above the sea.

The elevation of the plateau and mountains in **Central America** is not so great as in Mexico, falling to less than 1,000 ft. in **Panama**.

MOUNTAINS.—Two great ranges of **Cordilleras** fringe the Mexican plateau on either side, and meet in the Isthmus of

Tehuantepec. The western range is the higher, and is called **Sierra Madre**. There are many high peaks, of which **Popocatepetl** (18,000 ft.) and **Orizaba** (17,700 ft.) are the chief. Many of these mountains are volcanoes.

The most remarkable volcano is **Jorullo** (4,700 ft.), which was formed by a great upheaval in 1759.

COAST-LINE.—The eastern coast is generally low, with numerous long narrow islands enclosing lagoons; and the harbours, with the exception of that of **Belize**, are narrow and difficult. The western coast is high and rocky, with good harbours.

Capes.—**San Lucas**, at southern extremity of **Lower California**; **Catoche**, on the peninsula of **Yucatan**; **Gracias a Dios**, the eastern point of **Honduras**; **Corrientes**, on the west coast of **Mexico**.

Seas and Openings.—**West.**—**Gulf of California** (700 miles long), **Gulf of Tehuantepec**, **Fonseca Gulf**, and **Gulf of Panama**. **East.**—**Gulf of Mexico** with **Campeachy Bay**, **Caribbean Sea** with **Honduras Bay**.

CLIMATE AND RAINFALL.—A large portion of the country is within the tropics; but, owing to the general great elevation of the surface, only a comparatively small extent has a strictly tropical climate. There are three chief varieties of climate, but all are alike in having alternate **wet** and **dry** seasons. The climate is **hot** in the low swampy coast regions and for some considerable distance up the slopes. It is **temperate** on the lower portions of the plateau. It is **cold** on the higher parts of the plateau, but the term cold is merely relative and is not to be understood as of **Arctic** severity.

The **rainfall** occurs at stated seasons, and is abundant only on the mountain slopes and in the southern part of the plateau. Throughout almost all the country the supply is insufficient for agriculture, and irrigation is necessary. Towards the **United States** the country has a climate similar to the dry regions of **Texas**, **New Mexico**, and **Arizona**.

Local Causes.—1. The open exposure to the north winds causes a large part of the plateau to have a climate similar to the adjoining regions of the **United States of America**.

2. The great height of the mountains which border the plateau causes the rain-clouds to condense mostly on the outer slopes.

3. The prevailing winds are from the west, and have a tempering effect.

RIVERS AND LAKES.—The rivers are generally short, with falls where they leave the plateau. Flowing to the east the chief is the **R. San Juan** (120 miles), which drains **L. Nicaragua**. To the west, **Rio Grande de Santiago**, which drains **L. Chapala**.

Lake Tezcuco lies on the Plateau of **Anahuac**, and has the city of **Mexico** on its western bank.

FERTILITY.—The coastlands and seaward mountain slopes are remarkably rich, and produce great abundance of tropical plants, much of these regions being naturally covered with dense tropical forest. The hollows of the plateau, being well watered, are very fertile, particularly a district called **Laguna**. The northern part of the country and the higher parts of the plateau generally, together with Yucatan, are comparatively unproductive, the chief plants being of the cactus and fibrous order. Central America is generally fertile.

PRODUCTS.—1. **Agricultural.**—These range with the elevation from tropical to temperate plants.

In **MEXICO**, sugar, tropical fruits (particularly bananas), coffee, cacao or cocoa, tobacco, vanilla, cotton, maize, wheat, henequen (called hemp), maguey (yielding pulque, the favourite Mexican drink), rice, barley, and beans are cultivated.

The forest products are valuable hard and dye woods, such as mahogany and logwood.

In **CENTRAL AMERICA** the products are chiefly the more tropical of the above-named—viz. sugar, bananas, cacao, tobacco, vanilla, maize, rice, coffee, cotton, india-rubber, and indigo.

2. **Mineral.**—Silver, lead, copper, gold, coal, petroleum, iron, and mercury. Of these, silver has always been the most largely worked.

3. **Animal.**—Cattle, sheep, horses, and goats are kept in great numbers on the northern portion of the plateau, and many are exported to the United States. A vast area is devoted to the rearing of these animals.

The **Central American States** also possess a large number of cattle, sheep, horses, and pigs.

POLITICAL

MEXICO.—Area, 767,000 sq. miles.

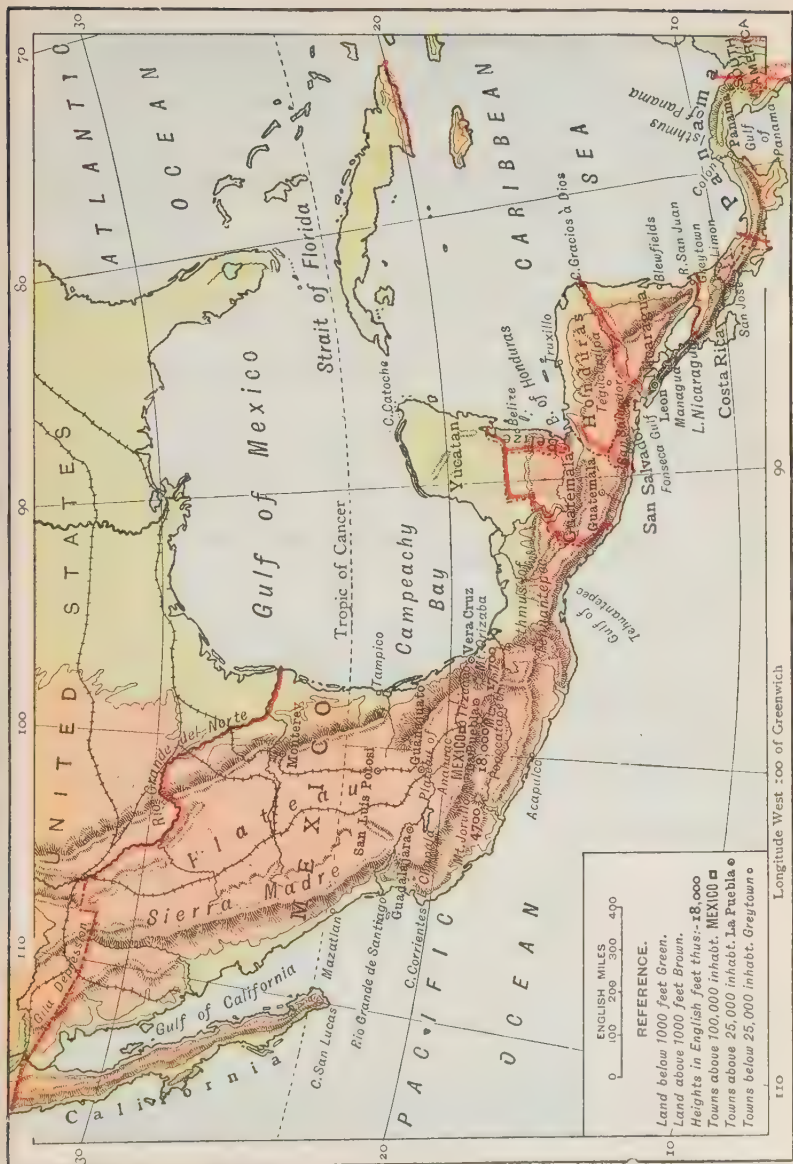
MANUFACTURES.—Cotton goods are manufactured in increasing quantities by the use of the abundant water power on the mountain slopes. Wool is manufactured to a small extent.

TRADE.—Until a few years ago Mexico possessed very little trade, owing to the extreme difficulty of transport; but since the construction of railways a great expansion of commerce has resulted.

MEANS OF INTERNAL COMMUNICATION.—Roads are very bad and seldom fit for wheeled vehicles, pack-mules being largely employed. The rivers are of small use for navigation.

Railways.—In 1914 there were about 11,000 miles of railway, and mileage

FIG. 248.—MEXICO AND CENTRAL AMERICA.



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is rapidly increasing. Three great railways on the plateau are connected with the United States system of railways. An important line runs from **Mexico to Vera Cruz** on the east coast. All the lines are remarkable for great elevation and for the great differences in level over short distances. Important lines are in progress across the **Isthmus of Tehuantepec** and from **Mexico to Acapulco**.

FOREIGN TRADE.—Imports.—Cotton and other textile fabrics, iron (wrought and unwrought), machinery, leather, and various other manufactured goods.

Exports.—Silver, gold, sisal grass, coffee, lead, hides, cabinet and dye woods, tobacco, vanilla, and petroleum.

It will be seen that the exports are the produce of the mines, forests, and fields, and that the imports are manufactured goods. The great bulk of the trade is with the United States and United Kingdom.

SEAPORTS.—**Vera Cruz** (48), **Tampico**, **Acapulco**, and **Mazatlan**.

Of these the first is the most important, and is the port for the most populous part of Mexico. The two last-mentioned are the Pacific ports.

DISTRICTS AND TOWNS.—Mexico consists of 28 States, 2 Territories, and a Federal District. Most of the towns are within a comparatively small area, several of the largest being upon the Plateau of **Anahuac**.

Mexico (1,000), on Lake **Tezcuco**, is the Federal capital and an important commercial city. This city was the capital of the **Aztec** empire, which was broken up by the Spaniards, under Cortes, in the sixteenth century.

Other large towns are **Guadalajara** (119), **Puebla** (96), **San Luis Potosi** (68), **Guanajuato** (35), **Monterey** (73), and sixteen others with more than 20,000 inhabitants.

These towns often lack the comforts and conveniences of modern cities, and are built in straggling fashion. Many of the houses are constructed of 'adobe,' or sun-dried bricks. The houses of the wealthy are generally built round a central courtyard, in which there are often a fountain and flowers.

POPULATION.—About 13,800,000, or 16 to a sq. mile (1921).

The inland States are the most populous; the Atlantic States the least populous.

THE PEOPLE.—White people form about 20 per cent. of the population, and are of Spanish origin almost exclusively. Mixed peoples, '**Mestizoes**,' form about 43 per cent., and the remainder are pure natives of Indian race.

All distinctions of colour in political privileges are abolished by the Constitution. Before the conquest of Mexico by the Spaniards in the sixteenth century, a native race, the **Aztecs**, had attained to a considerable degree of civilisation; but this empire was overthrown by Cortes in 1521. The country remained a Spanish colony until 1824, when freedom was fought for and won.

The United States obtained a large extent of territory by purchase and conquest, the former Spanish territory having extended into California, Texas, and the intervening States.

CENTRAL AMERICAN STATES.

<i>State</i>	<i>Area</i>	<i>Population</i>
Costa Rica . . .	23,000 sq. miles . . .	576,000
Guatemala . . .	48,300 „ . . .	2,000,000
Honduras . . .	44,275 „ . . .	662,000
Nicaragua . . .	51,660 „ . . .	638,000
San Salvador . . .	7,225 „ . . .	1,526,000
Panama . . .	32,380 „ . . .	434,000

MANUFACTURES.—Of very small importance.

TRADE.—The commerce of these States has suffered from the same causes as that of Mexico, though to a less extent, owing to the lower elevation of the surface and the narrowness of the country. The Panama Canal joins the Atlantic with the Pacific. It was opened in 1914.

Imports.—Manufactured goods.

Exports.—Coffee, bananas, hides, dye-woods, bullion, sugar, cattle, and indigo.

The trade is mainly with the United States, the United Kingdom, Germany, France, and the South American Republics.

SEAPORTS.—Truxillo, Greytown, Bluefields, Panama, and Limon.

The best harbour in this region is **Belize**, but this is a British town in a Crown Colony.

TOWNS.—**Guatemala** (90) is the largest town in the Central American States, and is the capital of Guatemala.

Leon (38), the old capital of Nicaragua, is surrounded by five volcanoes, and is partly in ruins.

Managua (28), on Lake Nicaragua, is the present capital of Nicaragua.

San Salvador (81), the capital of San Salvador, has been repeatedly destroyed by earthquakes.

Tegucigalpa (39), the capital of Honduras, is the chief place on the planned inter-oceanic railway.

San José (51) is the capital of Costa Rica.

Panama (66) and **Colon** or **Aspinwall** (3) are the chief towns in the State of Panama, which is important on account of the railway and the canal across the isthmus.

PEOPLE.—Mainly as in Mexico, but with a greater variety of Europeans, there being a considerable number of German, French, and British settlers.

All these States were Spanish colonies from the sixteenth until the nineteenth century.

GOVERNMENT.—Each State is an independent republic.

BRITISH HONDURAS.—British Honduras is a narrow strip of territory lying along the western side of the Bay of Honduras to the south of Yucatan, and forming a Crown Colony.

The climate is tropical and unhealthy for Europeans, but the colony is valuable owing to the abundant mahogany and logwood. The area is 8,598 sq. miles, and the population 45,000. The chief exports are mahogany, logwood, fruits (chiefly to New Orleans), and sugar. The imports are manufactured goods. The chief town is **Belize**.

British Honduras was at first possessed by the Spaniards, but they recognised England's right to the northern portion in 1670. Several attempts were made by Spain to drive the English out during the eighteenth century; but in 1786 the colony finally became British. It was at first a dependency of Jamaica, but was separated in 1870.

EXAMINATION PAPERS

- A. 1. Describe the contour of Mexico and Central America, (a) from north to south, (b) from east to west.
2. Describe the climate of Mexico, giving any local causes.
3. Name the chief vegetable products of Mexico, showing what causes influence the districts in which they abound.
4. Where are the Plateau of Anahuac, Sierra Madre, Popocatepetl, Gracias a Dios, Lake Nicaragua, Laguna, Tehuantepec, Vera Cruz, Guadalajara, and Truxillo?
- B. 1. Give some account of the Peninsulas of California and Yucatan, and the Plateau of Anahuac.
2. Show how communication between the coast and inland districts is difficult, and describe the route of the Nicaragua Canal.
3. Name the various races of people inhabiting Mexico and Central America, indicating their relative numbers and where any particular race predominates.
4. Name the States of Central America, with their capitals.

WEST INDIES

POSITION.—A great chain of islands, with many groups, stretching from about 120 miles east of **Cape Catoche** in a double curve to the mouth of the **Orinoco**, and westwards along the coast of **South America** to the Gulf of **Maracaybo**.

DIVISIONS.—Greater and Lesser Antilles, and The Bahamas.

Greater Antilles.—Cuba, Hayti, Jamaica, and Porto Rico.

Lesser Antilles.—These are divided by the English into **Leeward** and **Windward** groups, but these terms are variously used. Some geographers apply the term **Windward** to the **Lesser**, and **Leeward** to the **Greater Antilles**. Others call the islands along the coast of South America the **Leeward Islands**.

STRUCTURE.—These islands are mountainous and volcanic in origin, with the exception of the **Bahamas**, which are coral.

REFERENCE.
Towns above 100,000 inhabitants. **HAVANA**
Towns above 25,000 inhab. **Kingston**
Towns below 25,000 inhab. **San Domingo**
British Possessions coloured red.
(FR.) French. (U.S.) United States
(DUT.) Dutch.

Caribbean Sea
Atlantic Ocean
Gulf of Mexico
Central America
South America

Islands and Towns:
Florida, Nassau, Pinos, Santiago de Cuba, Hayti, Santo Domingo, Port au Prince, San Domingo, San Juan, Porto Rico, St. Christopher (U.S.), St. John, St. Thomas, Virgin Is., Barbuda, Antigua, Montserrat, Guadeloupe (FR.), Leeward Islands, Pointe à Pitre, Dominica, St. Pierre, Martinique (FR.), Windward, St. Lucia, Barbados, St. Vincent, St. John's, Bridgeton, The Grenadines, Grenada, Margarita, Tobago, Trinidad, Port of Spain, Mouths of the Orinoco.

Other Labels:
Bahama Islands, Tropic of Cancer, Gaicos Is., Turks Is., Hayti, San Domingo, Port au Prince, San Domingo, San Juan, Porto Rico, St. Christopher (U.S.), St. John, St. Thomas, Virgin Is., Barbuda, Antigua, Montserrat, Guadeloupe (FR.), Leeward Islands, Pointe à Pitre, Dominica, St. Pierre, Martinique (FR.), Windward, St. Lucia, Barbados, St. Vincent, St. John's, Bridgeton, The Grenadines, Grenada, Margarita, Tobago, Trinidad, Port of Spain, Mouths of the Orinoco.

Geographical Features:
Gulf of Mexico, Caribbean Sea, Atlantic Ocean, Central America, South America, Tropic of Cancer, Gaicos Is., Turks Is., Hayti, San Domingo, Port au Prince, San Domingo, San Juan, Porto Rico, St. Christopher (U.S.), St. John, St. Thomas, Virgin Is., Barbuda, Antigua, Montserrat, Guadeloupe (FR.), Leeward Islands, Pointe à Pitre, Dominica, St. Pierre, Martinique (FR.), Windward, St. Lucia, Barbados, St. Vincent, St. John's, Bridgeton, The Grenadines, Grenada, Margarita, Tobago, Trinidad, Port of Spain, Mouths of the Orinoco.

Scale:
0 50 100 150 200 250 300
ENGLISH MILES

Longitude:
85° West 70° of Greenwich

Longmans & Co, London & New York.

CLIMATE.—Being entirely within the tropics, except some of the Bahamas, the climate is alternately **wet** and **dry**, but always **hot**, with **hurricanes** between July and **October**.

Europeans find pleasant homes on the higher lands which form a large part of most of the islands.

PRODUCTIONS.—1. **Vegetable.**—Sugar, coffee, tobacco, corn, cotton, cacao, bananas, pine-apples, cocoa-nuts, lime-fruit, logwood and mahogany, all of which are largely exported.

Yams, manioc, and sweet potatoes for home consumption, these being the chief food of the people.

The production of cane sugar has been much lessened by the growth of beetroot in Europe. Tobacco manufacture suffers from competition in the United States.

2. **Mineral.**—There is but little mining. **Iron**, manganese, and copper are produced in Cuba; **salt** on some of the islets; **asphalt** from the pitch-lake of Trinidad.

3. **Animal.**—Turtle, sponges.

AREA.—About 90,000 sq. miles.

POPULATION.—About 5,000,000.

PEOPLE.—Various European nationalities, Negroes (all free) with many half-breeds, Chinese and Indian labourers called coolies. The native Indian population died off very rapidly after the arrival of the Spaniards, and there are now none surviving.

GOVERNMENT.—Hayti and San Domingo, both in the island of Hayti, are independent Republics. Owing to the intervention of the United States, Cuba is also an independent Republic, but largely under the influence of the United States. The other islands are owned by Great Britain, France, Holland, and the United States.

The Republic of Haiti contains about 10,200 sq. miles, with about 2½ million inhabitants, mostly Negroes. The most important products are coffee, sugar, cotton, and tobacco.

Cuba.—An Independent Republic. Area, 44,000 sq. miles; population, 2,800,000, nearly a million of whom are Spaniards, while in most of the other islands the black race is far the most numerous. Much of the island is still uninhabited and unexplored. The chief exports are sugar and molasses, tobacco and cigars. The chief imports are rice, lard, jerked beef, and flour, together with manufactured goods.

The imported food is largely used as rations on the plantations.

Havana (363,000), the capital, is the largest town in the West Indies. A great Government factory produces an enormous number of the cigars which are so much esteemed. Other important towns are **Matanzas** (62), and **Santiago de Cuba** (70). Till 1898 Cuba belonged to Spain.

UNITED STATES POSSESSIONS—Porto Rico, taken from Spain in 1898.—Area, 3,400 sq miles; population, 1,300,000. It

is said to be the healthiest of all the Antilles, and is thickly peopled. The chief town is **San Juan** (71).

Santa Cruz, St. Thomas, and St. John. Area, 138 sq. miles ; population, 32,000.

BRITISH POSSESSIONS are in six governments, viz. :

(1) **Jamaica** (4,200 sq. miles), with a number of small islands under its Governor, viz., **Turks, Caicos, Cayman Islands, &c.**

(2) **Bahamas** (4,404 sq. miles).

(3) **Barbados.**

(4) **Leeward Group**, comprising **Antigua, Barbuda, St. Kitts, Nevis, Dominica, Montserrat, and Virgin Islands.**

(5) **Trinidad** (1,754 sq. miles), with **Tobago.**

(6) **Windward Group**, viz. **Grenada, St. Vincent, The Grenadines, and St. Lucia.**

British Governors appointed by the Crown represent the Imperial rule ; but Executive and Legislative Councils exist in all the islands, partly nominated by the Crown and partly elected. The principle of representative government is in full operation.

TOWNS.—**Kingston** (62), capital of **Jamaica** ; **Bridgeton** (17), capital of **Barbados** ; **Nassau** (11), capital of **Bahamas** ; **Port of Spain** (34), capital of **Trinidad.**

Barbados is the most densely peopled of the West Indies, having over 1,000 inhabitants to a sq. mile.

Trinidad has the most extensive trade of the British West Indies.

JAMAICA, the largest of the British West Indies, is divided into three counties, viz. **Cornwall, Surrey, and Middlesex.** The island is mountainous, with a belt of low land round the coast. The soil is very fertile, and, in consequence of the elevation, the products are various. The chief crops are sugar, coffee, bananas, cacao, and corn. Of a population of about 858,000 the great bulk are Negroes.

Besides **Kingston**, there are **Spanish Town, Montego Bay, Savanna-la-Mar, and Falmouth**, with from 2,500 to 5,000 inhabitants.

FRENCH POSSESSIONS.—**Guadaloupe and Martinique**, with some small islands.

Guadaloupe.—Area, 688 sq. miles ; population, 229,000. Capital, **Pointe à Pitre.**

Martinique.—Area, 381 sq. miles ; population, 244,000. Capital, **St. Pierre.**

These islands have a French Governor, with elected councils as in the British West Indies.

DUTCH POSSESSIONS—**Curaçoa, Oruba, Bonaire** (**Buen Ayre**), all on the coast of **Venezuela.** Area, 403 sq. miles ; population, 55,000.

GENERAL EXPORTS OF THE WEST INDIES.—Sugar, rum and molasses, coffee, tobacco, arrowroot, cacao, dyes, spices, lime-fruit juices ; fruits, viz. bananas, oranges, and cocoa-nuts ; sponges.

IMPORTS.—Cotton goods, hardware and machinery, salt fish, wheaten flour, rice, meat, coal, leather, and saddlery.

The **trade** is generally with the United States, the Dominion of Canada, and United Kingdom, and particularly with the countries to which the various islands belong.

EXAMINATION PAPERS

- A. 1. State the position of the West Indies, name the divisions, and show how certain terms are variously used.
 2. Describe the climate of the West Indies, and name the chief vegetable products.
 3. Give a description of Hayti, indicating its position and political divisions, stating its products and how governed.
 4. Where are the following towns :—Havana, Port au Prince, Kingston, Nassau, Bridgeton, Matanzas, Port of Spain, San Juan, San Domingo, Montego Bay ?
- B. 1. Describe the natural formation of the West Indies, and show its effect upon the climate.
 2. Arrange the chief islands under their respective European owners.
 3. Describe Jamaica, with a sketch-map if possible.
 4. Name the chief exports of the West Indies.

SOUTH AMERICA

POSITION.—South America extends from $12\frac{1}{2}^{\circ}$ N. latitude to about 54° S. latitude, i.e. over 66° of latitude. Also from 35° W. longitude to 82° W. longitude. Four-fifths of the continent is in the Southern Hemisphere, and the great bulk is within the tropics.

BOUNDARIES.—**North.**—The Caribbean Sea and Atlantic Ocean. **East.**—The Atlantic Ocean. **West.**—The Pacific Ocean.

The Isthmus of Panama is included within the limits of South America.

SIZE.—Greatest length, about 5,400 miles.

Greatest breadth, about 3,200 miles.

Area, about 7,000,000 sq. miles.

RELIEF.—The **Andes** range of mountains extends along the whole of the west, and is the longest continuous chain in the world. From these the country slopes gradually to the east, forming vast plains which embrace the greater portion of the surface of the continent. There are two other elevated regions

of secondary size and importance: (1) The **Highlands of Brazil**, bordered on the east by a very narrow coast strip and including a large extent of moderately elevated surface. (2) The **Highlands of Venezuela and Guiana**, from which the land slopes to the north, and which divides the basins of the **Orinoco** and the rivers of **Guiana** from the **Amazon System**.

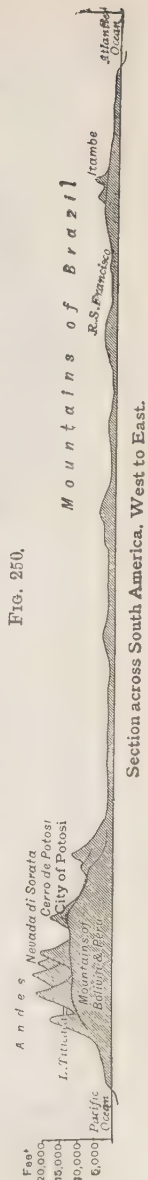
MOUNTAINS.—The **Andes Mountains**, or **South American Cordilleras**. In three divisions—viz. **Northern, Central, and Southern**.

1. **Northern Andes.**—From **Panama** to the neighbourhood of the **Equator**. This section consists of three parallel ranges somewhat close together, with high valleys drained towards the north by the **Magdalena** and **Cauca**. The system extends along the north coast towards the east under the name of **Sierra Nevada**. The northern section contains numerous lofty peaks, of which many are volcanoes. The highest are **Chimborazo**, 20,500 ft., and **Cotopaxi**, but little lower.

2. **Central Andes.**—In this section two ranges, somewhat wide apart, enclose the great and high table-land of **Titicaca**, which is remarkable for its extreme dryness. On this table-land lie **Lake Titicaca**, a large lake at an elevation of 12,600 ft. above the sea, and **Lake Aullagas**. This portion of the range is less volcanic than the northern and southern sections. The chief heights are **Mount Sorata**, 21,500 ft., and **Potosi**. The country immediately to the east of these sections of the **Andes** is generally thickly covered with forests, and has the name of the **Montaña**.

3. **Southern Andes.**—From about 23° S. latitude the system consists of one chain, with many lofty heights in the northern part, but with a gradually diminishing altitude and breadth. The highest measured peak in the whole range is **Aconcagua**, 23,000 ft. In this southern portion active volcanoes are numerous, and hence **Chile** (Chili) is extremely subject to earthquakes.

BRAZILIAN MOUNTAINS.—These comprise a great number of chains, generally parallel with the coast, enclosing valleys and table-lands. The land gradually rises from the **Atlantic** in



terraces or plateaux called **Campos**, which reach a height of about 5,000 ft. Upon these the mountains rise to a height of one or two thousand feet.

FIG. 251.—SOUTH AMERICA: RELIEF



NORTHERN MOUNTAINS.--This system forms the southern boundary of **Venezuela** and of **Guiana**, and extends for some distance to the northward into those countries. Much of

the country remains unexplored, but it is known that **Mount Roraima** reaches a height of 8,500 ft. These mountains are clothed with the densest tropical vegetation, and are drained by numerous rapid rivers which descend to the sea by many falls and cataracts. The most important range is called the **Parimé Mountains**.

PLAINS.—The **Llanos**, in the north, are broad plains filling the **Orinoco Basin**. These plains are often flooded in the rainy season, and are then covered with luxuriant flowers and grasses; but in the dry season the ground is parched and the vegetation dies off. Some of the native animals hibernate during the drought.

The **Selvas**, or wooded plains, occupy the Amazon Valley, and are covered with almost impenetrable forests, through which flow the mighty streams that combine to form the Amazon river system.

El Gran Chaco is a partly sandy and partly salt plain, which extends from Southern Bolivia into the **Argentine Republic**.

The **Pampas** are great level plains between the Andes and the river **Parana**, containing much grassy land.

The **Great Shingle Desert** occupies a large part of Patagonia.

The **Desert of Atacama** is a narrow strip of land between the Andes and the Pacific, for a considerable distance to the north and south of the Tropic of Capricorn. This region is almost rainless and exceedingly barren.

RIVERS.—Every considerable river in South America necessarily flows towards the north or east coast. The chief are the **Amazon**, **La Plata**, and the **Orinoco**.

Of less importance are the **Magdalena**, which receives the **Cauca** and flows from the Andes northwards into the Caribbean Sea. The **Cuyuni**, **Essequibo**, **Demerara**, **Berbice**, **Corentyne**, **Surinam**, and **Maroni** flow northwards from the mountains of Guiana. The **Paranahyba** and **San Francisco** (1,500 miles) are the chief rivers in Brazil outside the Amazon system. The **Colorado** and the **Negro** flow from the Andes to the east coast, south of the **La Plata**.

The Amazon.—This mighty river, or system of rivers, drains an area of $2\frac{1}{2}$ millions of square miles. It rises in the extreme west, and after flowing across the continent, enters the Atlantic Ocean, its course being nearly 4,000 miles. The **Amazon**, or **Maranon**, as its upper course is called, rises amongst the highest of the **Peruvian Andes**; and after flowing 700 miles through the mountain region reaches the plains with a width of half a mile. It receives numerous great tributaries which flow from the **Andes**, the **Brazilian Mountains**, and the **Mountains of Guiana**. The main stream is navigable for about 2,600 miles to the foot of the Andes; and, with its tributaries, furnishes a splendid means of communication with the

FIG. 252.—SOUTH AMERICA: PHYSICAL.



interior. The upper courses are generally impeded by falls and rapids. The chief tributaries on the right are **Ucayali**, having the most remote source, **Purus**, **Madeira**, which is unfortunately obstructed just after leaving Bolivia, **Tapajos**, **Xingu**, and **Tocantins**, which receives the **Araguay** and flows into the **Para Mouth**. On the left bank the **Yapura**, and the **Negro**, which by its tributary the **Casiquire** has communication for boats in the rainy season with the **Orinoco**. The river and its tributaries flow through the great **Selvas**, which they periodically inundate. The volume of water discharged by the Amazon is very great, and is unmixed with the ocean waters for a long distance from the land.

The **Orinoco** has a course of 1,200 miles and flows through the **Llanos**, which it fertilises by annual inundations. The main stream is navigable for about 1,000 miles, but the tributaries from the **Parimè Mountains** are obstructed by many cataracts.

The **La Plata** is formed by the junction of the **Parana** with the **Uruguay**. The **Parana** rises in Brazil, having many of its sources near those of the **Amazon** tributaries. It is joined by the **Paraguay**, which rises somewhat further to the north, for the dividing line between this system of rivers and the **Amazon** system runs from east to west in an irregular line. The sources of the **Paraguay** are very near to those of the **Madeira**. The **Paraguay** receives the **Pilcomayo** and **Vermejo** from the Andes; and the **Parana**, after joining the **Paraguay**, receives the **Salado** from the Andes and the **Uruguay** from the south-eastern Highlands of Brazil. The total length of this river from the most distant source is over 2,300 miles; and both the **Parana** and **Paraguay** are navigable for very long distances, the **Parana** being obstructed by the **Falls of Guaira**. These streams form a very valuable means of bringing the products of the **Central States** to the sea. The shallowness of the estuary is a serious drawback, but this is being remedied by dredging and other works.

The chief ports on the **La Plata** are **Monte Video** and **Buenos Ayres**. On the **Parana** are **Rosario**, which is available by large vessels, and **Asuncion**. On the **Uruguay** is **Paysandu**, and on the **Salado** is **Santa Fé**.

COAST LINE.—On the whole remarkably unbroken. In the east it is like that of North America, in many parts having a double coast line; but there are very few large openings. The west, for the most part, is exceedingly unbroken, with deep water close to the shore. To the south of **Chiloe Island**, 42° to 43° S. latitude, the coast is much indented, like that of North America north of **Vancouver Island**.

OPENINGS, &c.—I. On the North.—Gulf of **Maracaybo**, connected with **Lake Maracaybo** by a narrow channel; mouths of **Orinoco** and other northern rivers; **Estuary of Amazon**. On the East.—Rio de Janeiro Harbour; **Lake Patos**, in Southern Brazil, is really an arm of the sea with several ports; **La Plata Estuary**; Gulfs of **Matias** and **St. George**; **Magellan Strait**, between **Tierra del Fuego** and the mainland.

This strait is about 400 miles long, with a very winding and stormy channel, rendered more dangerous still by strong tides. Sailing vessels still prefer the passage round the stormy **Cape Horn**.

2. On the West.—Gulfs of **Guayaquil** and **Panama**.

FIG. 253.—SOUTH AMERICA: RAINFALL JUNE TO AUGUST.
SUMMER IN NORTHERN HEMISPHERE.



FIG. 254.—SOUTH AMERICA: RAINFALL DEC. TO FEB.
WINTER IN NORTHERN HEMISPHERE.

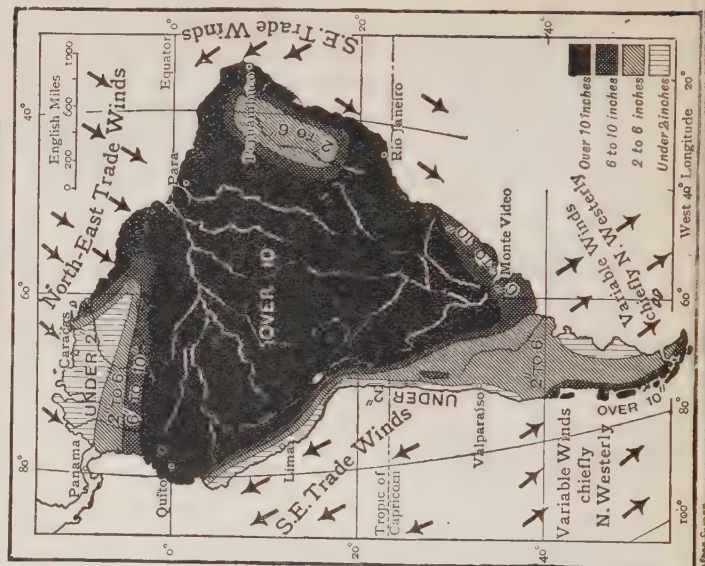
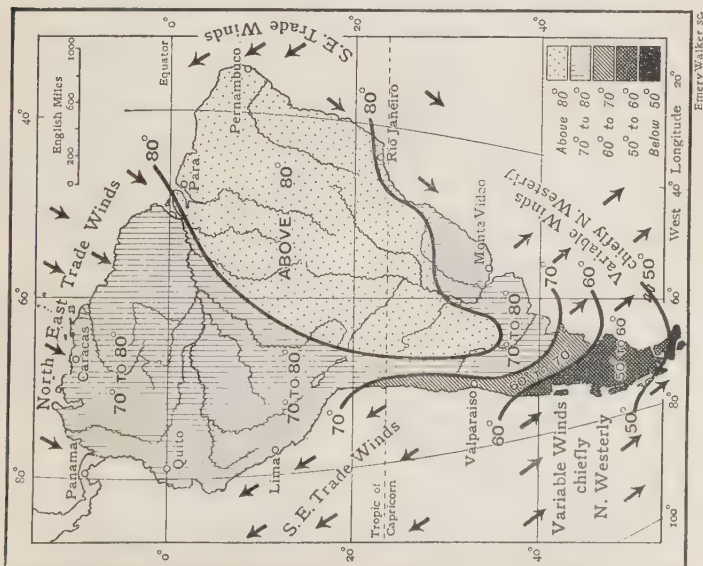
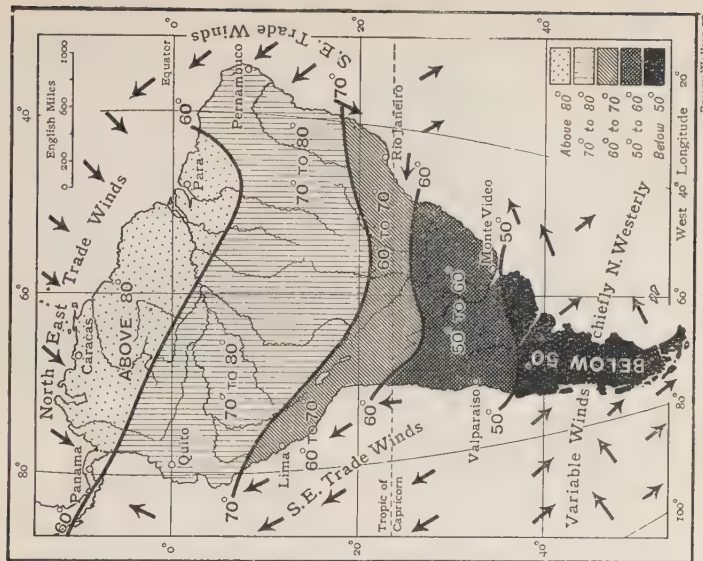


FIG. 255.—SOUTH AMERICA: JANUARY ISOTHERMS.



Emery Walker sc.

FIG. 256.—SOUTH AMERICA: JULY ISOTHERMS.



Emery Walker sc.

CAPIES.—North.—Point Gallinas. East.—Branco, the most easterly ; St. Roque, Frio, and Corrientes. South.—Cape Horn, on a small island ; Froward, the most southerly point on the mainland. West.—Parina, the most westerly.

ISLANDS.—Joannes, a large island in the estuary of the Amazon. Trinidad, a mountainous barren island in the Atlantic, 700 miles east of the Brazilian coast, in latitude 20° S. This island has no human inhabitants, but abounds with large land crabs. Falkland Islands, a group about 300 miles to the east of Magellan Strait, a calling-place for ships. The climate is inhospitable, but cattle and sheep are reared. These islands belong to Britain. Tierra del Fuego, the largest of the southern group. Chonos Archipelago and Chiloe, near the coast of Southern Chile. Juan Fernandez, about 400 miles from the Chilian coast. Guanape Islands, on the coast of Peru, of much value for the guano found there.

Galapagos Islands, on the Equator, over 600 miles to the west of Ecuador, to which they belong, are remarkable for animals peculiar to them. They have an area of 2,800 sq. miles, and a population of 400,000.

CLIMATE AND RAINFALL.—Four-fifths of the surface of South America is within the tropics, and the climate of the greater part is consequently tropical, with alternate wet and dry seasons. The main causes which produce variations in rainfall are the position and height of the Andes and the character of the prevailing winds. North of latitude 30° S. the south-east trade-winds prevail and bring copious rains to the Amazon Basin and the north coast. The northern section of the Andes has abundant rain on both sides. South of the Amazon Basin the Brazilian Mountains receive the greater part of the moisture, and hence the Campos of Brazil and the plain El Gran Chaco have a somewhat scanty supply of rain, while the western side of the Andes in the same latitude is remarkably dry, particularly the Desert of Atacama. South of latitude 30° S. the prevailing winds are north-west, and the western side of the Andes receives the rain, while the eastern plains, the Pampas and the Steppes of Patagonia, are dry. In the Equatorial States the effect of elevation upon climate is illustrated in a remarkable manner ; and hence the products are very varied.

PRODUCTIONS.—1. Vegetable.—In the well-watered tropical regions the variety of plants is remarkable and the natural products are very valuable. Some of the most valuable native products are mahogany and other hard woods, logwood and other dye-woods ; cinchona, or Peruvian bark, from which quinine is extracted ; oak, pines, and other trees of temperate

climates on the elevated regions ; manioc, from which tapioca is obtained.

Cultivated Plants.—Brazil nuts, india-rubber, coffee, sugar, tobacco, cocoa or cacao, spices, cotton, indigo, maize, wheat and other cereals, and rice.

These are distributed according to latitude and elevation. Only a very small portion of the soil is under cultivation.

2. Animals.—Native.—South America is remarkable for the great variety of species peculiar to itself. Monkeys, the tapir and peccary, sloth, chinchilla, armadillo, anteater, puma, jaguar, opossum, llama, and alpaca are some of the most remarkable. Snakes of great size and many varieties are abundant. Electric eels live in some of the rivers. Of the many species of birds, some of the most familiar are toucans, humming-birds, macaws, condor, rhea, &c. Insects are especially abundant and beautiful. Ants are fierce and destructive.

Domesticated Animals.—Horses and cattle (many descended from European ancestors, run wild on the great plains), sheep.

3. Minerals.—The mineral resources are great, but are little worked except the precious metals, and also copper and nitrates. The chief of those known to exist are gold, silver, diamonds, platinum, copper, mercury, iron, coal, and nitrates.

PEOPLE.—The population is small, being estimated at over 64 millions, or rather more than the population of the British Isles.

The great bulk are either pure Indian or half-breeds called **Mestizoes**. European races form about one-third, mainly Spanish, with Portuguese in Brazil, English, French, and Dutch in Guiana, and about one-half as many Negroes, who are now all free.

MEANS OF COMMUNICATION.—Roads suitable for carriages can scarcely be said to exist, and goods are carried on the backs of animals, mules in the east and llamas amongst the western mountains.

Railways are increasing. The most remarkable railway in the world is in the Western Andes of Peru, where a line ascends from sea-level to a height of 16,000 ft. in a remarkably short distance.

EXAMINATION PAPERS

- A. 1. Describe the relief of the surface of South America across the widest portion.
2. Name the chief rivers of South America, dividing them according to their drainage areas, and indicating the watersheds.
2. Name the chief vegetable products, indicating where each is cultivated or naturally abundant.
4. Name the races of mankind inhabiting South America, and give some account of the settlement by Europeans.

- B. 1. Describe the Andes, showing the natural divisions and naming the chief peaks.
 2. Describe the Amazon, with a sketch-map.
 3. Name the openings on the coast of South America, and show any disadvantages from which they suffer.
 4. Name the minerals and districts in which worked.
- C. 1. Give some account of the Brazilian mountains.
 2. Describe the La Plata river system, with a sketch-map.
 3. Name the islands on the coast, and describe the Falkland Islands.
 4. Give names of most important native and imported animals of South America, and mention the products from them which enter largely into commerce.
- D. 1. Describe the northern mountains.
 2. Proceed from north to south, naming the great plains, and describing their special natural features and products.
 3. Describe the climate, and show how affected by local causes.
 4. Show how goods are conveyed in South America, and mention any difficulties in making railways.
- E. 1. Explain the causes of the great difference in the rainfall—June to August—of the east and west coasts in latitude 30° south.
 2. Why is the rainfall from December to February so much less at Lima than at Rio Janeiro?
 3. What are the causes of the extreme dryness of Central South America from June to August?
 4. From a study of the winter and summer isotherms, and from what you know of the elevation of the country and the fertility of the soil, what parts of South America would be best fitted to support a large white population?

SOUTH AMERICAN STATES

General Political Facts

<i>State</i>	<i>Area</i>	<i>Population</i>	<i>Capital</i>
Brazil . . .	3,275,500 sq. m.	30,000,000	Rio de Janeiro (1,100)
Venezuela . .	398,000 „	2,412,000	Caracas (92)
Guiana (British) .	89,480 „	297,000	Georgetown (55)
„ (Dutch) .	46,060 „	113,000	Paramaribo (50)
„ (French), or Cayenne)	32,000 „	44,000	Cayenne (10)
Colombia . .	440,000 „	5,800,000	Bogotá (160)
Ecuador . .	220,000 „	1,400,000	Quito (80)
Peru . . .	722,000 „	5,500,000	Lima (176)
Bolivia . . .	514,000 „	3,000,000	Sucre (29)
Chile . . .	289,000 „	3,700,000	Santiago (507)
Argentine Republic	1,153,000 „	8,700,000	Buenos Ayres (1,575)
Uruguay . .	72,000 „	1,500,000	Monte Video (370)
Paraguay . .	75,000 „	1,000,000	Asuncion (100)

GOVERNMENT.—With the exception of Guiana, every South American State is a Republic, with a President, and two

representative Houses forming a Congress. The State Constitutions are generally on the model of that of the United States, with large powers to provincial and local governing bodies. In British and Dutch Guiana the Governor is assisted by elective bodies. The Republican States are peculiarly subject to internal dissension, and revolutions are frequent.

RELIGION.—The prevailing religion is Roman Catholic, but all sects are generally tolerated.

EDUCATION is generally free, State-supported, and nominally compulsory; but a great number of the people are illiterate.

ARMY.—A small standing army is maintained in most of the States; but military service is obligatory on all male citizens in time of need.

NAVY.—Brazil, Chile, Peru, and the Argentine Republic maintain considerable fleets of modern vessels. The navies of the other States are of small importance.

MANUFACTURES.—These are very insignificant. Some cotton goods are now manufactured in Brazil; straw hats in Peru and Ecuador; wines and spirits in Peru.

FOREIGN TRADE.—This consists almost entirely of an exchange of the products of mines, forests, and fields for the manufactured goods of Europe and the United States.

Particulars relating to the imports and exports of each State, together with the means of communication, are given in detail in succeeding pages.

BRAZIL

BOUNDARIES.—**North.**—The mountains of Venezuela and Guiana. **East.**—The Atlantic Ocean. **West and South.**—An arbitrary boundary.

FERTILITY OF SOIL.—Very fertile in the coast provinces and in the **Selvas**. Sterile on the inland **Campos**, producing only grass on large areas, owing to lack of rain. Only a small fraction of the surface is cultivated.

PRODUCTS.—1. **Vegetable.**—Coffee on the low hills west of Rio Janeiro. Sugar, tobacco, manioc, cotton, cocoa, and grapes. Of **Forest Products**, the chief are india-rubber, Brazil nuts, cabinet and dye woods. The natural wealth in the forests of Brazil is enormous.

2. **Animal.**—Cattle-breeding is largely carried on.

3. **Mineral.**—Gold is the chief. Iron is very abundant, but is little worked owing to want of fuel.

FIG. 259.—SOUTH AMERICA: PHYSICAL AND POLITICAL.



TRADE is carried on chiefly with the United States, the United Kingdom, Germany, and France.

Trade is steadily increasing, and this is partly attributable to the large immigration of Europeans, particularly Italians and Germans, and to the extension of the railways, of which there were 14,200 miles in 1912, while about 2,000 miles were in course of construction. These figures must be compared with those for England and Wales, where over 16,000 miles were in use in about one-fifty-fifth of the area of Brazil.

Imports.—Cotton goods; iron, wrought and unwrought; machinery and implements; woollen goods; coal. Other minerals, as lead, zinc and tin. **Leather goods.**

Exports.—Coffee (about 50 per cent. of the total value), rubber, sugar, tobacco, cotton, and hides and skins.

SEAPORTS.—Rio de Janeiro (1,100), a very fine city on a splendid harbour, and Santos, the chief coffee ports; Pernambuco (238) and Bahia (283), exporting cotton; Ceara (35), Para, and Maranhao (38), exporting forest products. On lake Patos, in Southern Brazil, are Pelotas, Rio Grande do Sul, and Porto Alegre, the ports of the pastoral district.

OTHER TOWNS.—There is no very large town in the interior of Brazil. San Paulo is a considerable place on the uplands at the back of Santos. Villa Bella and Villa Rica are small towns of the interior.

PEOPLE.—Europeans, mostly of pure or mixed Portuguese descent, form the bulk of the population. German and Italian colonies exist in the southern district lying outside the tropics to the west of Lake Patos. Of recent years considerable numbers of Russians and Spaniards have emigrated thither. Of the coloured population, the Negroes (all free) outnumber the Indians. The vast selvas and internal campos are very thinly peopled.

VENEZUELA

VENEZUELA.—The United States of Venezuela are a large country lying between Guiana and Colombia, and forming the basin of the Orinoco.

SURFACE.—In three zones: (a) Agricultural; (b) pastoral; (c) forest. Along the rivers the soil is very fertile, but on the llanos it is subject to severe drought in the dry season, and is then unproductive. After the annual inundation the llanos are covered with rich vegetation.

PRODUCTS.—1. **Vegetable.**—(a) In agricultural zone: Sugar, coffee, cocoa, cereals, &c.

(b) In pastoral zone: Grasses for cattle and other animals.

(c) In forest zone: Caoutchouc (india-rubber) and vanilla.

2. **Animal.**—Many cattle, sheep and goats, pigs, horses and mules.

3. **Mineral.**—Great abundance of mineral wealth. Gold, copper, silver, and iron the chief. Salt is also produced. The annual value of mineral products is over one million sterling.

TRADE.—The navigation of the Orinoco is free to all nations. There are about 644 miles of railway in use, but the ordinary roads are primitive, and communication in the mountain regions is very difficult.

Imports.—Manufactured goods, such as cotton, woollen, linen and jute, iron and machinery.

Exports.—Coffee, cocoa, gold, hides, skins and cattle, dye-woods and stuffs.

SEAPORTS.—**La Guayra, Ciudad Bolivar**, on the Orinoco, more than 200 miles from the sea; **Porto Cabello**.

OTHER TOWNS.—**Caracas** (92), the capital, is placed at a short distance from the sea in a hilly district. It is peculiarly liable to earthquakes, and has often suffered serious damage. The port of Caracas is **La Guayra**.

Valencia is similarly situated. **Maracaybo** is on the west side of the strait leading from the Gulf to the Lake of that name.

GUIANA

GUIANA consists of a plain along the coast watered by numerous rivers (*see* South America), and an extensive plateau crossed by high mountains and covered with dense forests.

BOUNDARIES.—British Guiana is partly bounded by the **Cuyuni** on the west and the **Corentyne** on the east. Dutch Guiana is between the **Corentyne** and the **Maroni**. French Guiana is between the **Maroni** and the **Oyapok**.

PRODUCTS.—**General.**—Coffee, sugar, with rum and molasses, and tobacco.

British Guiana also produces timber (hard woods) and gold.

Gold is found in the basin of the **Cuyuni River**, where the boundary is not clearly defined. The boundary between British Guiana and Venezuela was disputed for many years, but was settled by arbitration in 1899.

Dutch Guiana also produces cocoa, bananas, corn, rice, cotton, and gold.

French Guiana also produces spices.

PEOPLE.—**In British Guiana.**—East Indian coolies and Negroes form the great majority. The remainder are Europeans, Chinese, and native Indians.

In Dutch Guiana.—Dutch settlers and Negroes.

In French Guiana.—French settlers, Negroes, and Arabs. The latter are either convicts or liberated criminals, the colony being used as a convict settlement.

TRADE.—**Imports.**—Flour, rice, pork, butter, lumber, and manufactured goods.

Exports.—Sugar, rum, molasses, hard woods, gold, bananas, cotton, corn, and coffee.

TOWNS.—The towns are all near the coast on the river mouths.

In British Guiana.—**Georgetown** (55), the capital, on the Demerara; and **New Amsterdam**, on the Berbice.

In Dutch Guiana.—**Paramaribo** (50), the capital, on the Surinam.

In French Guiana.—**Cayenne** (10), the capital.

COLOMBIA

COLOMBIA (formerly the United States of, but now simply the Republic of) is a great country lying between **Venezuela** and **Ecuador**. The western portion is filled with the Andes, and the eastern portion is part of the basin of the **Orinoco**, embracing a portion of the **llanos**.

SOIL.—Much of the soil is fertile, but only a small portion is cultivated, owing to difficulty of communication, and agriculture is backward. The surface is largely mountainous, and exhibits in a remarkable degree vertical zones of vegetation. At a height of from 8,000 to 10,000 ft. is a charming climate, with products of temperate regions.

PRODUCTS.—1. **Vegetable.**—Coffee, cinchona, earth-nuts, corn, cocoa, and tobacco. 2. **Animal.**—Cattle. 3. **Mineral.**—Silver and gold.

TRADE.—The river **Magdalena** is navigable to **Honda**, a distance of over 500 miles. Of railways there were 470 miles in 1908. Roads are very bad, but are being improved. **Panama**, now an Independent Republic, contains the great ship canal that connects the Atlantic with the Pacific. **Colon** and **Panama** are the ports at each end. The canal was begun by a French company, and finished by the United States: opened for traffic in 1914.

Imports.—Food stuffs and textile fabrics.

Exports.—Coffee (mostly to the United States), hides, tobacco, cinchona, cocoa, rubber, cotton, silver, and gold.

SEAPORTS.—**Barranquilla** and **Cartagena**.

OTHER TOWNS.—**Bogotá** (160), the capital, is situated at a height of 8,500 ft. above sea-level, and enjoys continual spring. **Medellin** is a mining town with 79,000 inhabitants.

ECUADOR

ECUADOR lies between **Colombia** and **Peru**, and receives its name from the position of **Quito**, its capital, on the Equator.

SOIL.—Much of the soil is fertile, but agriculture suffers from lack of means of communication. The rainfall is plentiful, and vegetation is abundant on both sides of the mountain system.

The eastern slopes of the Andes are clothed with forest, and are called the **Montaña**.

PRODUCTS.—1. **Vegetable.**—Cocoa, coffee, rubber, sugar, tobacco, and rice.

2. **Animal.**—Hides.

3. **Mineral.**—Gold and silver, copper, iron, and lead. Petroleum is abundant, but is not worked.

TRADE.—More than one-half of the foreign commerce is carried on in British ships, and less than one-third in national vessels. Communication between **Quito** and **Guayaquil** has been much improved by the opening of a railway. But there are only about 400 miles of railway in the country, and the ordinary roads are of the rudest description. In the coast region the rivers afford considerable facilities by means of shallow-draught steamers.

The great bulk of the trade is with the United States, the United Kingdom, France, and Germany.

A remarkable decline in the value of **cinchona** exported has taken place owing to the great development of cinchona cultivation in **Ceylon** and the **East Indies**.

Imports.—Manufactured cotton and other fabrics, iron goods, provisions.

Exports.—**Cocoa** (much the most valuable), coffee, gold and silver, rubber, hides, straw hats, and sugar.

SEAPORT.—**Guayaquil** (100) is the only considerable port, and is the second town of the State.

OTHER TOWNS.—**Quito** (80), the capital, has been previously mentioned for its delightful climate. It is situated upon the **Plateau**, between the two ranges of **Cordilleras**, where the bulk of the people reside.

PEOPLE.—About two-thirds are **Indians**. The others are Spanish and Negroes.

BOLIVIA

BOLIVIA is now entirely an inland State, its coast-line having been taken by **Chile** in the war of 1879–80.

SURFACE.—In the west is a very high plateau, that of **Titicaca**, with many lofty mountains surrounding it. In the east the surface slopes down to the Amazon basin, forming part of the **Montaña**, and is watered by the **Madeira**, a large tributary of the Amazon.

SOIL.—The eastern slope is very fertile, and increases in production with improved communication.

PRODUCTS.—1. **Vegetable.**—Rubber, cocoa, cinchona, coffee, and gum.

2. **Mineral.**—Silver (the mines of **Potosi** have been worked for many centuries), gold, copper, tin, and lead.

TRADE.—This is hindered by the difficulty of reaching the **Pacific** because of the mountains, and the **Atlantic** on account of the distance; but commerce is growing with the extension of railways, of which 800 miles exist, and many important lines are projected. The foreign trade is carried on through the ports of **Arica** in Peru, and **Buenos Ayres** in the Argentine Republic.

Imports.—Textile fabrics and machinery are the chief.

Exports.—Tin (the most important), silver, rubber, and copper.

TOWNS.—**La Paz** (107) is the largest and most important town, and has its turn as capital of the Republic.

Cochabamba and **Sucre** have each about 30,000 inhabitants. **Oruro** is sometimes the capital.

PEOPLE.—Whites form only about one-fourth of the population, the great bulk being Indians or Mestizoes.

CHILE

CHILE embraces the whole of the coast strip from **Peru** to the middle of **Tierra del Fuego**, including both shores of the **Magellan Strait**. The length from north to south is over 2,500 miles, and the breadth does not reach 200 miles at any point.

SURFACE.—The northern part consists of the extremely dry desert of **Atacama**, where irrigation is attempted to some small extent. The southern coast is much indented, and is bordered with many islands. The middle section, from 33° S. lat. to 38° S. lat., is the most fertile, and has the bulk of the population; but agricultural methods are backward. At a short distance inland the surface rises sharply towards the **Andes**, the highest ridge of which forms the eastern boundary of Chile.

PRODUCTS.—1. **Vegetable.**—Wheat, wine, barley, maize, fruits, such as oranges and lemons, apples and peaches.

2. **Animal.**—Sheep and cattle.

3. **Mineral.**—Nitrate is by far the most important; copper, silver, coal, gold, iodine.

The first-named is obtained in the desert strip and exported to Europe, especially to Great Britain, to be used as a fertiliser of the soil.

TRADE.—Owing to the great mineral resources of Chile, especially of copper and nitrate of soda, a large trade is carried on, and this is facilitated by the nearness of all parts to the sea and by the existence of a considerable length of railway. In 1920 the length of lines open for traffic was 5,400 miles. The Chilean railway system west of the Andes has been joined to the Argentine railways by a line across the Andes. The traffic over the Andes is through passes more than 14,000 ft. high, and is largely carried on by means of llamas.

Exports.—Nitrate of soda, copper, tin-ore, and wool are the chief. Others are barley, wheat, and other grain.

Imports.—Cotton and woollen fabrics; iron—wrought, unwrought, and machinery; coal, refined sugar, and cattle.

The bulk of the trade is with the United Kingdom. Also with Germany, the United States, and France.

SEAPORTS.—**Valparaiso** (182), the chief importing centre. **Iquique** and **Pisagua**, from which the bulk of the exports are sent.

Talcahuano, **Coquimbo**, and **Antofagasta** follow in order of their tonnage.

DISTRICTS AND TOWNS.—The territory of **Antofagasta** was taken from Bolivia in 1880. **Tarapaca** was ceded by Peru in 1883. Chile also holds the Peruvian province of **Tacna**, and claims **Easter Island**, in the Pacific.

Santiago (507), the capital and largest town, lies to the east of **Valparaiso**. **Concepcion** is a town very subject to earthquakes.

PEOPLE.—The majority of the **Chilians**, or **Chilenos**, are whites of Spanish extraction; but there is a large mixture of other nationalities—viz. Peruvians, Bolivians, Argentines, Germans, English, French, and Italians. The population is about 10 per sq. mile, or about twice the density of South America as a whole. **Population**, 3,700,000.

ARGENTINE REPUBLIC

This great country includes all South America south of Brazil and east of Chile, with the exception of **Paraguay** and **Uruguay**. The western boundary is the highest ridge of the **Andes**; bounding **Uruguay** is the river **Uruguay**; and bounding **Paraguay** are the rivers **Pilcomayo** and **Parana**. The eastern half of **Tierra del Fuego** is included in this country. **Area**, 1,100,000 sq. miles.

SURFACE.—This consists of vast plains sloping down to the Atlantic from the **Andes**, bearing the name **El Gran Chaco** in the north, partly of a saline and sterile character, and partly of an open forest country; the **Pampas**, or grassy plains, to the south and west of the **La Plata** estuary; the **Great Shingle Desert**, in **Patagonia**.

CLIMATE.—In the eastern parts about the **River Plate**, and in the north near the **Brazilian Mountains**, there is generally a sufficient rainfall, diminishing towards the west, with considerable warmth. On the **Pampas** the rainfall is scanty. The extreme south has a disagreeable climate, with much rain and fog, and cold winters. In the west of the **Great Shingle Desert**, at the base of the mountains, is a good extent of fertile land. Little more than one per cent. of the soil is cultivated.

PRODUCTS.—1. **Vegetable.**—Wheat, maize, grass, barley, vines, tobacco, cotton, and sugar.

Over 250,000,000 acres are suitable for farming or cattle raising, and of these about 10,000,000 acres require irrigation. In 1921 about 14,800,000 acres were under wheat.

2. Animal.—Cattle and sheep are kept in enormous numbers. Horses also are numerous. In 1920 there were 45,000,000 sheep, 29,000,000 cattle, and over 9,000,000 horses in this country.

The great wealth of the Republic is in its herds and flocks, and large quantities of meat and wool are sent to Europe.

3. Mineral.—Coal is worked to some extent, but the country is deficient in mineral wealth.

TRADE.—The Argentine Republic carries on much trade. The vast animal wealth causes a great export. The trade with the United Kingdom for 1922 amounted to about £79,000,000.

The rapid development of the country by the immigration of Southern Europeans has caused a large import of manufactured goods; and the extension of the railway system has produced a great demand for the necessary material. The bulk of the foreign trade is with Great Britain, France, Germany, Belgium, and the United States.

MEANS OF COMMUNICATION.—By river a large traffic is maintained. The level surface has caused a greater extension of the railway system than in any other part of South America. In 1922 there were 21,900 miles open for traffic. These have been almost entirely constructed with European capital.

IMPORTS.—Textiles and apparel, iron and iron goods, railway and telegraph material, various food substances, wood and wooden manufactures; pottery, glass, &c.; coal, coke, and chemicals.

EXPORTS.—Wheat (the most important), maize, fresh beef and mutton, wool, hides, and flax.

The wool is chiefly exported to Antwerp, and special machinery is used on the Continent in its manufacture. Wheat is exported in increasing quantities; its value in 1920 was over £38 millions.

SEAPORTS.—Buenos Ayres (1,700). This port and all the River Plate ports suffer from the shallowness of the estuary, caused by the great quantity of silt brought down.

La Plata (150) is a new port some forty miles nearer the sea than Buenos Ayres, and having deeper water.

Rosario (265), on the Parana, can be reached by seagoing vessels.

OTHER TOWNS.—Cordoba (150), Tucuman (91), and Mendoza (58) are all connected with Buenos Ayres by railways.

POPULATION.—8,600,000, about 7 to a sq. mile. The people are largely of Spanish extraction, with many half-breeds; Indians, called *Gauchos*, who hunt on *El Gran Chaco*, and a large number of European settlers—viz. Italians, French, Spanish (mostly Basques), British (a Welsh Colony at Chubut, in Patagonia), and Germans. The natives of Patagonia are very tall, and obtain their living by hunting guanaco and rheas. The *Fuegians* are a very degraded race, with little clothing and wretched dwellings.

URUGUAY

URUGUAY is a republic north of the **La Plata Estuary**, and east of the **Uruguay River**, with an arbitrary boundary towards Brazil.

SURFACE, SOIL, AND PRODUCTIONS are similar to the neighbouring provinces of the **Argentine Republic**, and the country is being developed by large European immigration, as in the latter country.

TOWNS.—**Monte Video** (351), also the capital and chief port. Large vessels have to lie some distance from the shore to load and unload.

Paysandu and **Fray Bentos** are well known for the canning of meat, especially tongues.

PARAGUAY

PARAGUAY lies between the **Pilcomayo** and **Parana**. The population is very scanty, and consists chiefly of Indians. The chief product is **Yerba Maté**, or Paraguay tea, which is largely exported to other South American countries. Other products are maize, manioc, sugar, beans, tobacco, and cattle. Minerals, as in Uruguay, are little worked.

TRADE suffers from the remoteness of the country from the sea, and is carried on by the river Parana. **Asuncion** (100) is the capital and largest town.

PERU

Peru is a large country in the west of South America, and lies entirely within the tropics.

SURFACE.—Very diversified, with three distinct regions—viz. 1. The **Coast Strip**. 2. The **Andes**, with valleys and tablelands, including part of the **Titicaca Plateau**. 3. The **Eastern Slope**, called the **Montaña**, which is densely wooded.

SOIL.—Much of the soil is fertile and cultivated; but more could be profitably tilled with a good system of irrigation on the coast region fed by the **Andean** streams.

PRODUCTS.—1. **Vegetable.**—Very various, owing to the great difference in level, and consequently of temperature.

Cotton, coffee, and sugar, cocoa, rice, tobacco, wine and spirits, and maize, are all produced; besides forest products, such as india-rubber, cinchona, and dyes.

2. **Animal.**—Wool of the alpaca and vicuna, both animals of the sheep family.

Guano is, properly speaking, an animal product, but it is worked as a mineral, and can be classed with the phosphates.

3. **Minerals.**—Silver, gold, lead, copper, petroleum, and nitrate of soda.

Minerals are not now extensively worked in Peru. The district containing most of the nitrate has been ceded to Chile.

MANUFACTURES.—Straw hats, wines and spirits.

TRADE.—The foreign commerce is chiefly with Great Britain, the United States, and Germany. Internal communication is being improved by the construction of railways. The **Lima-Oroya** Railway crosses the Andes at a height of 15,600 feet. The other Andean railway is from **Mollendo** to **Puno**, on Lake Titicaca, upon which steamers now run.

Imports.—Cotton and woollen goods, iron and iron goods, and machinery, coal, timber, &c.

Exports.—Metals and minerals, sugar, alpaca and sheep's wool, raw cotton, copper, and silver.

SEAPORTS.—**Callao** (52) the port of Lima, **Mollendo**, and **Arica**. The commerce of Bolivia is chiefly carried on through the latter two ports.

Lima (176), the capital, is an unhealthy town, some few miles inland from Callao. The most ancient University in South America is at Lima, its charter having been granted early in the sixteenth century by the Emperor Charles V.

PEOPLE.—Mostly Indians, civilised and uncivilised. A large number of Chinese coolies are engaged on the lowland farms.

FALKLAND ISLANDS

The Falkland Islands lie in the South Atlantic, 300 miles east of Magellan Strait, and consist of **East Falkland** (3,000 sq. miles) and **West Falkland** (2,300 sq. miles), together with about 100 small islands having an area of 1,200 sq. miles. **South Georgia**, 1,000 sq. miles, lying nearly 800 miles eastward of the group, is included in the colony, which therefore has a total area of 7,500 sq. miles. The population is about 2,200.

The chief **industry** is sheep-farming, and the **exports** are **wool**, frozen mutton, hides and skins, and tallow. The **imports** are provisions, wearing apparel, timber, machinery, and iron goods. Vessels frequently call at these islands for provisions or to be repaired. Whaling vessels also make the islands their centre. The chief settlement is **Stanley**, in East Falkland.

The climate is temperate, but there is very little sunshine, and the ordinary crops of England will not ripen. The colony is directly dependent upon the Crown.

EXAMINATION PAPERS

- A. 1. Name the countries of South America, with their capitals.
2. What South American countries have a remarkable variety of vegetable products? Account for this.
3. Describe the position of Rio Janeiro, Buenos Ayres, Quito, and Lima; mention any special advantages or disadvantages attached to such position.
4. Name the distinctive exports of Brazil, Chile, Guiana, and the Argentine Republic.

- B. 1. Mention three South American countries whose development has been rapid in recent years, and give reasons.
2. Name eight seaports of South America, and attach to each one or more prominent articles of export.
3. Compare the surface of Bolivia with that of Uruguay. Name their chief products, and mention any physical or political circumstances which may have retarded or advanced their progress.
4. Where and what are the Montaña, El Gran Chaco, the Campos, Atacama, La Guayra, Cayenne, Titicaca, Iquique, the Pampas, Santos?
- C. 1. Mention any remarkable engineering works projected or completed in South America.
2. Give some account of the history of Brazil and of Chile.
3. Say what you can of the government, religion, and education of the South American States generally, and mention any local peculiarities.
4. Name the countries producing coffee, cocoa, cinchona, spices, wheat, and caoutchouc, and mention any interesting facts connected with the development or decay of their production.
-

AUSTRALIA

POSITION.—Australia is a great island-continent lying between 11° S. lat. and 39° S. lat., and between 113° E. and 153° E. long. A large portion is, therefore, within the tropics, and no part extends into the colder temperate regions.

BOUNDARIES.—On the north and north-west, the Indian Ocean; east, the Pacific Ocean; and south, the Southern Ocean.

SIZE.—Area, nearly 3,000,000 sq. miles.

Greatest length from east to west, over 2,400 miles.

Greatest breadth from north to south, about 2,000 miles.

RELIEF.—The greater part of the surface of Australia is elevated 1,000 ft. or more above the sea; but there is a marked distinction between the eastern and western halves. In the east, a long ridge of high land lies parallel to the coast at a short distance, presenting a steep face towards the sea. This ridge, throughout nearly the whole of the east of Australia, forms the edge of a high plateau of varying breadth, gradually falling to plains towards the west, but sometimes forms a true mountain range with plains on both sides, as in **Victoria**. Almost the whole of the western half is a plateau about 1,000 ft. in height, with a number of short ranges and detached heights scattered over its surface. From north to south, in the centre of Australia, lie low plains which are exceedingly dry and barren. It is believed that these plains once formed the bed of a sea which divided Australia into distinct eastern and western parts.

MOUNTAINS.—The Dividing Range.—This extends through Victoria, New South Wales, and Queensland, and has many local names. In Victoria the range lies almost exactly across the middle of the colony from west to east, widening and increasing in height towards New South Wales. In New South Wales the range is at no great distance from the sea, but in Queensland a range lies along the coast, and wide downs stretch away inland to

the Dividing Range is one small part of the whole of the E. mountains. The whole lot from N-S, are the Gt. Dividing System.

the **Dividing Range**. In Queensland several ranges also stretch out westward from the main ridge.

Victoria.—The **Grampians** form the extreme western portion of the range, and the **Australian Alps** form the eastern portion. **Mount Bogong** forms a range in which the highest peak is 6,500 ft. high.

New South Wales.—In the extreme south is the **Kosciusko Group**, containing **Mount Townsend** (7,250 ft.), the highest peak in Australia. The

FIG. 260.—AUSTRALIA: RELIEF.



Blue Mountains, west of Sydney, have a remarkably steep front to the east, and formed for many years an impassable barrier into the interior. Further north are the **Liverpool** and **New England Ranges**.

Queensland. The highest peaks viz. **Mount Bellenden-Ker** (5,500 ft.) and **Dalrymple** (4,250 ft.), are in the **Coast Range**. The **Dividing Range** has many names, some of which are **Expedition Range** and **Denham Range**. Other connected ranges are the **McKinlay**, **Drummond**, and **Peak**.

Mountains of South Australia.—The mountains are in three divisions—(a) in the south; (b) in the centre; and (c) in the north.

(a) **Flinders Range** stretches north and south from Lake Eyre to Spencer Gulf, and ends in a range called **Mount Lofty**, on the east of St. Vincent Gulf.

Mount Brown, a peak at the head of Spencer Gulf, is 3,000 ft. South of Lake Gairdner is the **Gawler Range**.

(b) The **Macdonnell Ranges** (3,000 to 4,000 ft.) and **James Range**, with a number of scattered elevations, form the central mountains.

(c) In the north is a table-land 3,000 to 4,000 ft. in height, and a number of short ranges of hills.

In **Western Australia** the ranges of hills mostly lie near the coast, but there are many detached hills and groups of hills further inland.

The chief range is the **Darling Mountains**, over 3,000 ft., along the south-west coast. Others are **Mount Murchison**, **Mount Bruce**, **Weld Mountains**, and **Hamersley Mountains**.

PLATEAUX.—The **Western Plateau** is named in different parts the **Great Victoria Desert**, the **Sandy Desert**, and the **Great Sandy Desert**. In the east are the **Liverpool Plains** and the **Darling Downs**.

PLAINS.—The **Riverina**, between the Murray and the Darling; **Wimmera**, a large dry district, capable of irrigation, in the north-west of Victoria; the **Desert Plain** round **Lake Gairdner**, and the **Great Stony Desert** to the north-east of **Lake Eyre**.

RIVERS.—Australia is far from being a well-watered country. Many of the rivers dry up in the dry season, or end in marshes and lakes without reaching the sea. Most of the permanent rivers are in the east and south-east, where the rainfall is greatest. Along the northern coasts, where the climate is tropical, there are numerous short rivers fed by the periodical heavy rains. The mountains are not of sufficient height to allow of great deposits of snow and the formation of glaciers, and hence a steady supply of water is lacking. Only in the extreme south-east are there streams fed by the melting of snow.

The **Murray** is the only really large river in Australia. In length it is 1,300 miles from the source of the main stream, but it is 2,345 miles from the source of the **Darling**, its chief affluent. The Murray rises in the **Kosciusko Group**, in the south of New South Wales, and flows in a west and north-west direction, forming the boundary between Victoria and New South Wales. Turning sharply after entering South Australia, it enters **Lake Alexandrina**, and so communicates with the sea. The mouth is much obstructed by a sand-bar, which is a continuation of the dunes which form the coast. Connected with Lake Alexandrina is a long narrow lagoon called

The Coorong, sheltered by this ridge of sand dunes. The Murray is navigable for some hundreds of miles by small steamers, but diminishes in volume towards its mouth owing to the great evaporation and the lack of tributaries near the sea.

In this it resembles the **Nile** and the **Missouri**.

TRIBUTARIES.—**Right Bank.**—**Murrumbidgee**, itself receiving the **Lachlan**; **Darling**, which, with its many affluents, drains the greater part of New South Wales.

Left Bank.—**Ovens**, **Goulburn**, **Campaspe**, and **Loddon**, all flowing northwards from the Victoria Mountains.

The **Darling** and most of the streams flowing from the **Dividing Range** westward vary in depth according to the rainfall, sometimes being deep streams, and at other times either totally disappearing or dwindling into a chain of pools.

Rivers flowing from the Dividing Range to the South and East.—**Hunter**, **Hawkesbury**, and **Clarence** in New South Wales; **Brisbane**, **Fitzroy**, and **Burdekin** in Queensland.

The Queensland rivers are peculiarly subject to floods.

Rivers flowing into the North Coast.—**Flinders** and **Mitchell** in Queensland; **Victoria** and **Roper** in South Australia.

Rivers of Western Australia.—**Swan** (200 miles), **Murchison**, and **Ashburton**.

Rivers of the Interior, or Continental Rivers.—**Diamantina**, and the **Barcoo** or **Cooper's Creek**, which flow from the eastern highlands to **Lake Eyre**; **Finke**, which rises in the **Macdonnell Ranges** and disappears in a desert.

LAKES.—The Australian lakes resemble the rivers in their varying volume. They lie in depressions of the surface, and in the rainy season have a large area. Most of them have no outlet and are salt.

The chief are **Eyre**, **Torrens**, **Gairdner**, **Amadeus**, and **Frome** in South Australia; **Austin** and **Moore** in West Australia.

Lake Alexandrina, at the mouth of the Murray, is connected with **Lake Albert** and the **Coorong**.

COAST LINE.—Generally speaking, the Australian coast resembles that of Africa in having few great openings; but it has many more fairly large openings than Africa.

The best harbours are mostly in the south-east and east. In the north the coast has many small openings fringed with mangrove swamps, especially in the **Gulf of Carpentaria**. The south coast between **Cape Leeuwin** and **Spencer Gulf** is remarkably unbroken, there being no harbours for many hundreds of miles in the **Great Australian Bight**. Steep cliffs line this great indentation for a very long distance.

SEAS AND OPENINGS.—**Arafura** and **Timor Seas** in the north; **Coral Sea** in the north-east.

FIG. 261.—AUSTRALIA: PHYSICAL AND POLITICAL.



The largest opening is the **Gulf of Carpentaria**, which has remarkably low and flat shores.

The remaining important openings are **Port Jackson**, **Port Phillip**, **Gulf of St. Vincent**, **Spencer Gulf**, **Great Australian Bight**, **Shark Bay**, **King Sound**, **Cambridge Gulf**, **Queen Channel**, and **King George's Sound**.

CAPIES.—**C. York**, the most northern; **Point Danger**, in the east; **Howe**, in the south-east; **Wilson's Promontory**, the most southerly; **Leeuwin**, in the south-west; and **North-West Cape**.

STRAITS.—**Torres** (90 miles wide), between **Cape York** and **New Guinea**. This is much obstructed by coral reefs. **Bass** (120 miles wide), between **Victoria** and **Tasmania**.

ISLANDS AND REEFS.—Islands are very numerous near the north-western, northern, and north-eastern coasts of Australia, but they are generally very small. Numerous islands of **Malaysia** and **Melanesia** lie near Australia.

Tasmania, a large island of the same formation as Australia, lies to the south, and is separated from Australia by Bass Strait.

Kangaroo Island lies off St. Vincent Gulf, **Melville Island** on the northern coast, **Prince of Wales Island** and many others in Torres Strait, the most familiar being **Thursday Island**, which is much visited by ships.

Lord Howe Island, lying to the east of New South Wales, 420 miles from Sydney, and **Norfolk Island**, between New Zealand and New Caledonia, about 900 miles from Australia, are considered to be Australian islands and belong to New South Wales.

Great Barrier Reef.—This extends along the east coast from Torres Strait to about $22\frac{1}{2}^{\circ}$ S. lat., a distance of 1,200 miles, generally about 10 or 20 miles from the shore, but in places nearly 100 miles. The reef is of coral formation, and is bordered by very deep water on its outer side. Between the reef and the mainland is a smooth passage, much used by vessels but great care is necessary. Several deep passages, some miles in width allow of communication between the inner channel and the open sea. In its widest part the reef is 100 miles across.

CLIMATE AND RAINFALL.—In temperature, the climate varies from tropical in the north to warm temperate in the south. The chief characteristic is dryness over almost all the continent. Large areas in the central parts of Australia have a very small rainfall, less than 2 ins. from June to August and about the same quantity from December to February when the eastern and northern coasts are receiving heavy rains. The prevailing winds are from the south-east, and hence the eastern coast-strip has a good rainfall throughout the year; but this diminishes rapidly towards the interior, and in places almost fails. During the hot

FIG. 262.--AUSTRALIA AND NEW ZEALAND : JANUARY ISOTHERMS AND
RAINFALL DECEMBER TO FEBRUARY.



FIG. 263.--AUSTRALIA AND NEW ZEALAND : JULY ISOTHERMS AND
RAINFALL JUNE TO AUGUST.



season the air over the great internal plains becomes very hot and rarefied, and thus any moisture carried over from the sea cannot be condensed. In the tropical north, the rains fall chiefly in the summer. The south-west receives a good rainfall brought by winds that counteract the prevailing land winds. The climate has the advantage of being generally healthy for Europeans.

The local causes which modify the climate of Australia are :

1. The low elevation of a great part of the interior causes the atmosphere there to become very hot, and hot winds to be generated.

2. The elevation of much of the surface of Queensland has the effect of causing the heat to be less there than it would be otherwise.

3. Cool winds from the Southern Ocean modify to some extent the heat of summer, and tend to counteract the hot winds from the interior.

4. The position of the main mountain range near the east coast causes condensation to take place freely, and hence that coast region has a good rainfall.

5. The mountains are nowhere so high as to allow of the formation of glaciers, which might have a cooling influence, or to prevent the passage of winds whether hot or cold.

6. Vapours borne by the wind over the central plains are driven to a great height, and cannot be condensed into rain owing to the great heat of the atmosphere.

FERTILITY OF SOIL.—This varies with the rainfall. The most productive districts are between the **Dividing Range** and the sea, and in the tropical coast regions. In the interior are large tracts producing nutritious grasses which sustain vast numbers of sheep. These tracts are in the basin of the Darling, and in the west and north-west.

The eastern uplands have many extensive grassy tracts, such as **Darling Downs** and **Liverpool Plains**. Many large tracts lying along the rivers are capable of irrigation, *e.g.* **Wimmera** in Victoria.

The seaward slopes of the Dividing Range are covered with dense forests of tall trees, particularly gum trees (eucalyptus), and the coast regions of Western Australia also produce excellent timber.

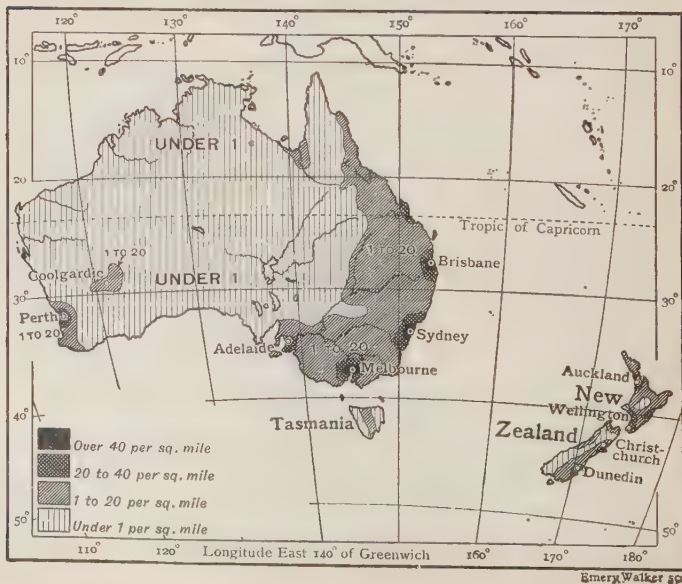
In **Victoria**, not far from **Melbourne**, is a district containing the highest trees in the world.

In many parts the surface is covered with a dense growth of shrubs, such districts being called **scrub** lands. On many of the great plains of the interior grows a valuable plant called **salt-bush**, which affords food for sheep in the dry season when the grasses have dried off. The term 'The Bush' is generally used

FIG. 264.—AUSTRALIA AND NEW ZEALAND: VEGETATION AND PRODUCTS.



FIG. 265.—AUSTRALIA AND NEW ZEALAND: DENSITY OF POPULATION



in speaking of the interior in its natural state, plains more or less grassy, with trees scattered here and there.

PRODUCTS.—1. **Vegetable.**—The indigenous vegetable products of Australia are peculiar, and show that it is a very long period since the continent was connected with the other great land masses. The channels between Australia and the islands of New Guinea and Tasmania are not very deep, and there is a close resemblance in their flora and fauna to that of Australia. On the other hand, a very deep channel separates Australia from the Malaysian Islands, and the flora and fauna are very unlike.

The species of plants in Australia are very numerous; but there is a remarkable scarcity of native food plants.

The chief trees are numerous **eucalyptus** (about 50 varieties) and **acacias**. **Cedars** grow on the eastern slopes of the great mountain range. The **spinifex**, a prickly shrub, is very abundant in the dry plains. **Kangaroo grass** and **saltbush** are also widespread, and remarkable for their growth in very dry soil. European and tropical plants have been freely introduced and flourish remarkably. The most extensively cultivated are **wheat** and other **cereals** in the more temperate regions, **maize**, **vine**, **sugar**, **cotton**, **tobacco**, **fruits** of many kinds, **coffee**, **ginger**, **arrowroot**, and **olives**.

2. **Animal.**—The native animals mostly belong to the oldest known species of animals, the **marsupial**, or pouch family, the largest being the **kangaroo**. Others are the **wombat**, **opossum**, **sloth**, and **bandicoot**. Besides these there are the **dingo**, **ornithorhynchus** or **platypus**, commonly called the **duck-bill**, and **ant-eaters**.

Birds of gay plumage, such as **parrots**, **cockatoos**, and **birds of paradise**, are numerous. The largest bird is the **emu**, a running bird. The remarkable **bower** and **lyre** birds are also natives of Australia. **Birds of prey**, *e.g.* **eagles**, **hawks**, and **owls**, are numerous; as are also **migratory** birds, such as **geese** and **ducks**.

Reptiles are represented by **alligators** in the northern rivers, **snakes** in all parts (several species, especially the **death-adder**, being venomous), **lizards**, and **scorpions**.

Insects.—**Ants**, very numerous, and the **white** variety destructive, **locusts**, and **bees**.

Fish.—Very plentiful in the rivers and on the coasts, with many species unknown in European waters. On the other hand, some European fishes, as **bream**, **mullet**, **rock-cod**, **whiting**, **mackerel**, and **oysters** are abundant in all the Australasian seas. British fishes, such as **salmon** and **trout**, have been introduced, and the latter attain to a large size.

Whales and seals live near some of the coasts, and sharks are everywhere abundant in the seas and harbours.

3. **Mineral.**—Gold has been obtained in great quantities during the last sixty years, both from alluvial deposits by digging and washing and from quartz by crushing. The former are now mostly exhausted. Silver, lead, tin, and copper are also abundant, and are worked in large quantities. Coal of varying quality is found in several districts of the eastern coast-strip.

TRADE.—Australia has a very large trade per head of population. The diagram shows the total amount of trade with other countries. This subject is dealt with more fully in the descriptions of the various states that comprise the Commonwealth.

FIG. 266.—COMMONWEALTH OF AUSTRALIA: TRADE WITH OTHER COUNTRIES, 1920-21.

Value of Imports from—		Value of Exports to—	
United Kingdom	£84,500,000	United Kingdom	£67,500,000
3 India	7,000,000	3 Egypt	9,709,000
7 Ceylon	848,000	7 India	2,100,000
4 Canada	4,646,000	4 New Zealand	7,700,000
4 South Africa	415,000	6 South Africa	3,000,000
France	389,000	2 United States	9,965,000
4 Japan	5,348,000	5 Japan	3,117,000
United States	35,601,000		
New Zealand	2,300,000		

PEOPLE.—The aborigines of Australia are called **Australian Negroes**, and are a people of low civilisation. They live in small tribes or large families, and wander over large stretches of country. They are a very dark-skinned race, with protruding lips, wide nostrils, low foreheads, and straight hair. Their dwellings are most primitive and temporary in character, their dress scanty, and their food often of a nature disgusting to Europeans. They manifest much skill in the chase, and use a weapon, the **boomerang**, of remarkable ingenuity. It is difficult to estimate their number, they are rapidly diminishing. They are most numerous in the northern territory of Southern Australia. Unlike the Maoris, they attempt no competition with Europeans in civilised pursuits.

The **total population** of the Commonwealth is over 5,436,000 (1921), and consists mainly of people of **British** race, with a considerable number of **Germans**, some **Chinese**, whose entrance is now limited by heavy poll-taxes, and **Polynesians**, on the plantations of the tropical regions.

EXAMINATION PAPERS

- A. 1. Describe the relief of the surface of Australia, comparing it with that of Europe.
2. Give a general description of the river system of Australia, and name the chief streams, stating the coast to which they flow.

3. Name the chief wild and domestic animals of Australia, and describe any peculiarities of the former.
 4. Where and what are Wimmera, Kosciusko, Bellenden-Ker, Eyre, the Riverina, Darling Downs, the Coorong, Great Barrier Reef, the Grampians, and Cooper's Creek?
- B. 1. Name and describe the mountains between Wilson's Promontory and Cape York.
2. Describe the climate of Australia, and show how it is affected.
 3. State the position and names of the Australian lakes, and account for their peculiarities.
 4. Name the chief minerals of Australia, and say where they abound. Give any results that have followed the discovery of gold in Australia.
- C. 1. Compare the coast line (1st) with that of Europe, (2nd) with that of Africa.
2. Name and describe the chief plateaux of Australia.
 3. Compare the climate of Australia with that of British South Africa, by a comparison of the Isotherm and Rainfall maps.
 4. Give an account of the soil and the vegetable productions of Australia.

VICTORIA

POSITION AND BOUNDARIES.—Victoria lies between 34° and 39° S. lat. and between 141° and 150° E. long. It occupies the south-eastern corner of Australia, and is separated from New South Wales on the north by the river Murray, except for a short distance between the source of that river and the sea; and on the west 141° E. long. separates Victoria from South Australia. The extreme southern shores are washed by Bass Strait.

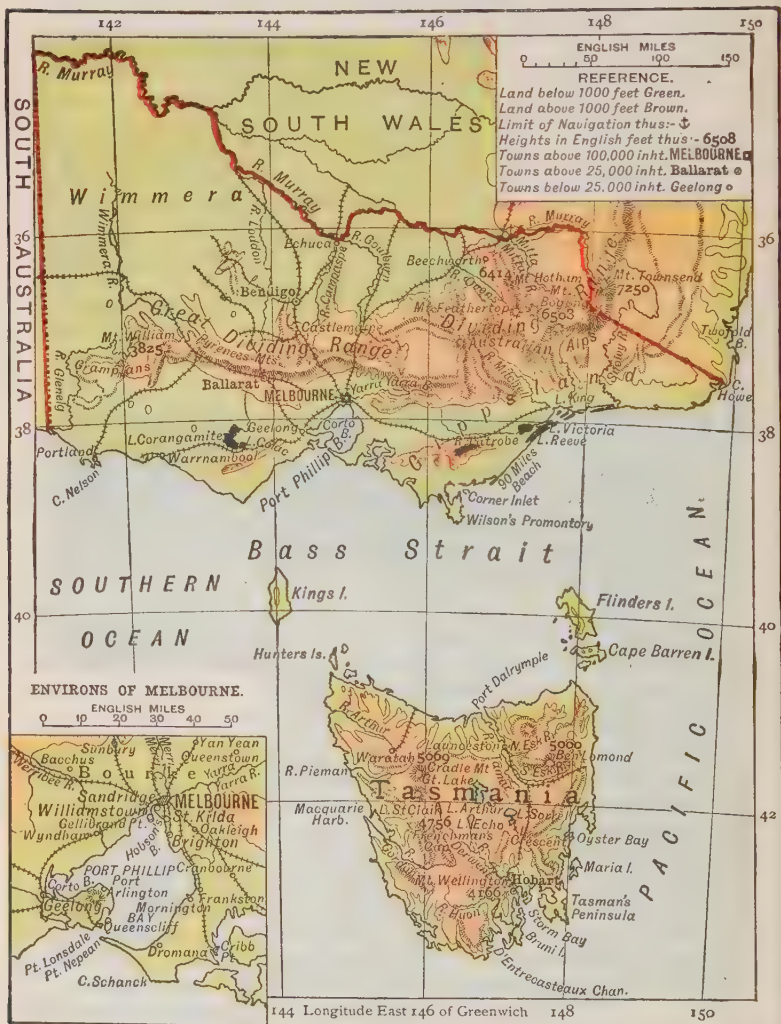
SIZE.—The extreme length is 420 miles, and the width 250 miles, and the colony has an area of 87,884 sq. miles, or about $\frac{1}{34}$ th part of Australia.

The area is thus a little less than that of Great Britain.

RELIEF.—The **Dividing Range** stretches across the colony from east to west, filling the colony in the east, and gradually narrowing with diminished height towards the west. It forms a true mountain range, the land sloping on the north towards the Murray and on the south to the sea. The main ridge is 60 or 70 miles from the coast, and the range is generally very steep, with few passes, and is thus a serious barrier to communication. The highest peaks are covered with snow for several months in the year, and the snow in melting feeds many rivers. The lower mountain slopes are covered with forests. The eastern portion of the range is called the **Australian Alps**, and the western portion the **Pyrenees**. From the latter the **Grampians** are an offshoot. The highest peaks are **Mount Bogong** (6,508 ft.),

Feathertop and **Hotham** (over 6,000 ft.), and many over 5,000 ft. **Mount William** is a conspicuous peak in the western range.

FIG. 267.—VICTORIA AND TASMANIA



A large part of the west of Victoria is occupied by a plain known as **Wimmera**, which is covered with dense scrub. The plain along the south-east coast, called **Gippsland**, is well watered, and contains much good forest and pasture land.

COAST-LINE.—This is generally unbroken, having few good harbours. The chief inlets are **Port Phillip**, a very spacious sheet of water with a difficult entrance; and **Corner Inlet**, almost cutting off **Wilson's Promontory** from the mainland.

Lake Victoria is a lagoon on the coast of Gippsland.

CLIMATE AND RAINFALL.—Victoria has no great extremes of heat, and never more than a few degrees of frost. The highest known temperature in the shade is 111° , and the lowest 27° . Generally, the temperature reaches over 100° about four times per annum, and goes below 32° about three times.

The rainfall is sufficient on the south of the mountain range, but is generally too scanty for cultivation on the north, and, therefore, irrigation has to be resorted to for successful agriculture in many districts. The rain mostly falls in winter, when the temperature is never low enough for any continued frost or snow on the plains. The summers are always dry. On the highest mountains snow falls in large quantities, and its melting causes some of the rivers to be well supplied with water. The average rainfall at an observatory 91 feet above sea level is $25\frac{1}{2}$ inches. Irrigation works are conducted by the State and by local authorities, as well as by private enterprise; the most extensive being in the **Wimmera**.

RIVERS.—The **Murray** flows for 980 miles along the Victoria frontier, and receives many tributaries from the Dividing Range of Victoria, the chief being the **Mitta-Mitta**, **Ovens**, **Goulburn** (345 miles long), **Campaspe**, and **Loddon**.

To the south of the Dividing Range flow the **Snowy** (300 miles long, partly in New South Wales), **Mitchell**, **La Trobe**, and **Yarra Yarra**. The **Glenelg** is the chief stream in the west. The chief navigable streams in Victoria are the **Murray**, **Yarra Yarra**, **Goulburn**, **La Trobe**, and **Mitchell**. Many rivers are dried up in summer, or only pools are left; but these are now being used to supply storage reservoirs for many purposes.

LAKES.—There are many lakes, both salt and fresh; and there are, besides, many extensive swamps in the wet season. Some of the lakes are in the craters of extinct volcanoes.

Lake Corangamite, 90 sq. miles in area, is a salt lake with no visible outlet, situated some distance to the south-west of Geelong.

Lake Colac, $10\frac{1}{2}$ sq. miles, is a fresh-water lake a short distance from Corangamite.

Lakes Victoria, King, and Reeve are lagoons on the Gippsland coast connected with the sea by narrow channels.

PRODUCTS.—1. **Vegetable.**—Wheat, oats, barley, potatoes, hay, wine, and fruits are the chief crops.

Olives, tobacco, hops, and many other European crops are successfully grown.

South Australia and Victoria have of late years produced a large quantity of wine, which is much esteemed, and is exported to Europe and India.

Forests are very extensive on the mountain slopes. The chief trees are the various species of eucalyptus—viz. the giant gum, the red gum and the blue gum trees. The latter produces an oil which has valuable properties for the prevention of infectious disease.

2. **Animal.**—Sheep, cattle, horses, and pigs are reared in large numbers, and form a large proportion of the wealth of the colony. The number of sheep in 1922 was over 12 millions; there were also about $1\frac{3}{4}$ millions of cattle and about half a million horses.

Wool, meat preserved in tins, chilled meat, hides and tallow, are the chief animal products exported. Victorian wool is of very fine quality.

3. **Mineral.**—Gold is produced in gradually decreasing amounts, mainly by quartz crushing. The chief centre of this industry is **Bendigo**.

The alluvial gold, the discovery of which excited the civilised world in 1851, was found in the district in which **Ballarat** now stands.

Many other minerals are found—viz., tin, copper, antimony, silver, lead, building-stone, basalt and coal (both good black coal and lignite).

MANUFACTURES.—Over 140,000 persons are engaged in the manufacture of goods, which are almost entirely consumed at home. **Woollen** goods of coarse description are made at **Geelong**. Leather goods, wine, refined sugar, flour, beer, pottery, and soap, are all made in the colony.

TRADE.—The total value of the commerce of all the Australian Colonies is very large, owing chiefly to two causes:

(a) The great value of gold, which is produced in all the colonies.

(b) The occupation of the bulk of the population in farming operations, which causes a great quantity of produce to be available for export and necessitates a large import of manufactured goods.

In 1920-21 the total value of goods imported into the Australian Colonies was about £163,000,000. The total exports

were about £132,000,000. These amounts do not include the inter-colonial trade. For the same year Victoria imported goods to the value of £36,000,000 and exported goods to the value of £34,000,000. These figures are exclusive of bullion and specie.

Victoria has considerable traffic with the other colonies, importing wool from New South Wales, re-exporting tea from India, and receiving raw sugar from Queensland to refine.

INTERNAL COMMUNICATION.—Victoria has 4,300 miles of railway, all the property of the State. The Murray affords excellent communication for hundreds of miles, and small vessels can pass along its tributaries, and also along most of the rivers of the southern slope. **Canals**, except for irrigation purposes, do not exist.

Imports.—Woollen and cotton goods, live stock, sugar, coal, tea, iron and steel (raw and manufactured), timber, and miscellaneous goods, such as paper, beer, ale, musical instruments, &c.

Victoria imports wool from New South Wales, and exports it to Europe.

Exports.—Wool, gold, breadstuffs, comprise more than one-half of the total value.

Leather, leather-ware, and leather-cloth, refined sugar, and tallow, are also of considerable value. Victoria also re exports tea and live stock.

The trade is mainly with the United Kingdom, and other Australasian Colonies, the United States, and India.

TOWNS.—**Melbourne** (nearly 795), on the river **Yarra**, near its confluence with **Port Phillip**. Through this seaport about 80 per cent. of the imports, and about 90 per cent. of the exports, are carried. The city has some very fine buildings, with wide streets lined with trees, and it has some good parks. The public institutions comprise public libraries, art gallery, museums, technical and music colleges, zoological gardens, observatory, &c.

Geelong (36), a seaport on **Corio Bay**, an inlet in the west of **Port Phillip**. Woollen manufactures are carried on here.

Ballarat (38), to the north-west of Melbourne, in the centre of the district in which alluvial gold deposits were first worked. It is a handsome and well-built city.

Bendigo (33), the chief quartz-crushing town, to the north of Ballarat. **Beechworth**, **Echuca**, **Castlemaine**, are also inland towns.

POPULATION.—The population in 1921 was about 1,531,000, giving an average of about 17 persons to the sq. mile.

Victoria is the most densely peopled of all the Australian Colonies. Its area is about $\frac{1}{34}$ of Australia, but it contains 29 per cent. of the total number of inhabitants. About three-fifths of the people of Victoria live in towns.

THE PEOPLE.—The great majority are by birth or descent British. The aborigines number less than 1,000, and the Chinese about 7,000.

GOVERNMENT.—In each colony the Executive Government is vested in a **Governor**, appointed by the Crown, with two Houses of Parliament—viz., a **Legislative Council**, generally elected by voters having some special property or educational qualification, and a **Legislative Assembly**, elected by the whole body of voters.

In Victoria the Governor is assisted by a Cabinet of ten ministers. The Legislative Council is elected by voters with property qualification, and the members receive no pay for their services. The Legislative Assembly is elected by all men over twenty-one, not being criminals, and the members receive £500 per annum.

COMMONWEALTH OF AUSTRALIA.—The five Continental Colonies and Tasmania have adopted a scheme of Federation, which came into force January 1, 1901. **Canberra** is to be the capital.

ARMY.—A very large army has been raised and taken part in the Great War.

NAVY.—Under the Australian Defence Scheme the Commonwealth provides and maintains certain war ships that form an Australian Squadron of the Royal Navy.

NEW SOUTH WALES

POSITION AND BOUNDARIES.—New South Wales lies north of Victoria, east of South Australia, south of Queensland, and has the South Pacific Ocean on its eastern coast.

The southern boundary is the main stream of the Murray and a line drawn from its source to Cape Howe.

The western boundary is long. 141° E.

The northern boundary is 29° S. latitude from the 141st meridian to the river **Macintyre**, then that river and a spur of the **Great Dividing Range** that touches the coast at Point Danger.

SIZE.—Area, 309,432 sq. miles.

It is three and a half times the size of Great Britain, and is larger than any country in Europe except Russia.

Greatest length, 850 miles.

Greatest breadth, 760 miles.

The average breadth is about 600 miles.

RELIEF.—The surface of New South Wales is divided into three distinct zones:—

(a) **The Coast Strip**, from 30 to 100 miles in width.

This is bordered along the sea by the **Coast Ranges**, which are mostly of only moderate height and width, though occasionally rising to considerable elevation.

FIG. 208.—NEW SOUTH WALES.



NOTE.—The site of the new capital is marked by a small circle to the south-west of Goulburn.

(b) **The Plateau Region.**—The eastern edge of the plateau is formed by the Great Dividing Range, which is continuous throughout the colony, and presents a very steep face to the sea, while the inland slope is very gradual.

(c) **The Great Plains**, which comprise the great bulk of the country. The surface is varied by some detached elevations in the western part, and at intervals by hills on both sides of the Darling at some distance from the river. Between the Murray and the Darling a great level district is known as the **Riverina**.

MOUNTAINS.—The **Great Dividing Range** consists of seven chief ranges and many of less importance. Starting from the south, the chief are:

The **Kosciusko Group**, a continuation of the Australian Alps, having Mount Townsend, 7,250 ft., and Mount **Kosciusko**, 7,200 ft.

The **Monaro, Gourock, and Cullarin Ranges**.

The **Blue Mountains**, having Mount **Beemarang**, 4,100 ft.

The **Liverpool Range**, with **Oxley's Peak**, 4,500 ft.

The **New England Range**, with **Ben Lomond**, 5,000 ft.

The **Blue Mountains** for many years formed an impassable barrier to communication westwards, but the difficulties have been overcome by engineering skill, and the range is now crossed by a railway which ascends from the plains by great zig-zags.

In the **Coast Range** the highest peak is **Mount Sea View**, 6,000 ft., in the northern section of the range.

Of the interior ranges, **Mount Arrowsmith**, 2,000 ft., is the highest; and **Mount Findlay**, 2,900 ft., is the highest of the detached peaks.

The most famous western ridge is the **Barrier Range**, in which are the famous **Broken Hill** silver mines, near the frontier of South Australia.

COAST LINE.—The coast is 700 miles in length, and extends from **Point Danger** in the north to **Cape Howe** in the south. It is somewhat indented, but there are no great openings. The mouths of the numerous rivers generally form harbours, which are either naturally good or can be improved by dredging. The chief openings are **Port Jackson**, a deep inlet with many windings, making the coast of the inlet 165 miles in length; **Port Hunter**, into which flows the river Hunter, **Broken Bay**, and **Jervis Bay**.

Others are **Botany Bay**, which is very shallow, **Bateman's Bay**, and **Twofold Bay**, the **Clarence River**, and **Hawkesbury River**.

Twofold Bay was formerly the centre of the Australian whaling industry.

CLIMATE AND RAINFALL.—Being almost entirely situated between 29° S. and 35° S., the temperature is never very low over the greater part of the surface, and the snow-line on the mountains is high. The variety in the elevation of the surface

causes a good deal of difference in the climate of various parts, ranging from tropical heat in the northern plains to cool temperate on the higher parts of the plateau region. The great drawback to the climate is the dryness, which increases from east to west.

The rainfall varies from 51 inches per annum near Sydney to 11 inches on the borders of South Australia. Very severe droughts occur at certain periods, and cause much suffering to the live stock and loss to the farmers.

All along the eastern part of the plateau the rainfall is sufficient for agriculture; but in the western plains irrigation is generally necessary for the production of crops. The climate is extremely healthy in almost all parts of the colony.

RIVERS.—(a) To the west of the Great Dividing Range, almost the whole of New South Wales is in the basin of the tributaries of the **Murray**.

(b) In the Coast Strip are numerous rivers of short or moderate length.

(c) The north-western corner is scantily watered by short streams which end in swamps or lakes. Many of these streams entirely disappear in the summer.

Tributaries of the Murray.—The **Darling**, which receives the **Gwydir**, **Castlereagh**, **Macquarie**, and **Bogan**.

The **Darling** flows 1,160 miles from its source to its confluence with the **Murray**. These rivers are navigated during the rainy season by small steamers carrying wool.

The **Macquarie** forms extensive marshes on both sides.

The **Murrumbidgee** rises near the source of the **Murray** and flows 1,350 miles before joining the **Murray**. It is joined by the **Lachlan**, which is 700 miles long.

Coast Rivers.—The **Hawkesbury**, the longest, is 330 miles long. It has received the name of the Australian Rhine.

Hunter, 300 miles; **Shoalhaven**, 260 miles; **Clarence**, 240 miles; **Manning** and **Macleay**.

The mouths of these rivers are often impeded by sandbanks, and the water is very variable in depth.

LAKES.—**Lake George** (16 miles by 5 miles), 25 miles south-west of **Goulburn**, is the largest lake in the colony.

This lake is salt and without outlet.

FERTILITY OF SOIL.—The soil of the Coast Strip is alluvial and is very rich. In the mountain district and on the plateau the soil is loamy and generally fertile. The inland districts possess much excellent soil, which only needs water to produce most abundant crops.

A large proportion of the surface of New South Wales is covered with grass, upon which over 40 millions of sheep are fed.

The northern coast region is very fertile, and is suitable for the growth of semi-tropical products.

Only a very small part of the colony is under cultivation.

PRODUCTS.—1. **Vegetable.**—Wheat, maize, oats, barley, potatoes, tobacco, oranges, timber, sugar, and the vine.

These are the most important crops; but experiments have shown that the colony can successfully produce coffee, mulberry trees for silkworms, olives, rice, indigo, cinchona, &c.

2. **Animal.**—**Sheep** (about 34 millions in 1921), about $4\frac{1}{2}$ millions of **cattle**, **horses**, **pigs**, and European domestic animals generally.

The sheep are kept on the great 'runs' of the plateau and western plains, on both the grassy and the saltbush plains. Wool is the most valuable product of the country, and over 240 millions of pounds were produced in 1921.

3. **Mineral.**—**Gold** (very widely distributed, and chiefly obtained by crushing quartz), **silver**, and **lead** in the west; **copper** in the centre at **Cobar**; **tin** in the north; **coal** chiefly in the neighbourhood of **Newcastle**, on the **Hunter River**. There are also precious stones, manganese, asbestos, antimony, and many others.

Enormous quantities of silver have been produced from the **Broken Hill** in the Barrier Range in the extreme west, and conveyed to **Adelaide** for shipment.

MANUFACTURES.—In the year 1921 about 145,000 persons were engaged in various processes and manufactures; but the colony is largely dependent upon Europe for manufactured goods.

In order of the value of products, the chief industries are—Preparation of foods and drinks, metal-working and machinery, building materials, clothing and textile fabrics, paper, printing, binding, &c. Also numerous articles of domestic use, as furniture, bedding, harness, saddlery, and vehicles.

TRADE.—As in Victoria, the commerce consists chiefly of an interchange of the produce of the soil and of the mines for manufactured goods.

In 1921 the total value of the imports was over £43,000,000, and of exports over £47,700,000, excluding colonial trade.

The value of exports actually produced in the colony is nearly £20 per head of the population, an amount exceeded only by Western Australia among the colonies, and by Holland among European countries.

The commerce is chiefly with the other Australian colonies, the United Kingdom, and the United States.

MEANS OF COMMUNICATION.—In 1922 there were 5,274 miles of railway open for traffic, a large part being the property of the State.

The **Zigzag Railway** over the **Blue Mountains** is one of the greatest engineering feats in the world.

IMPORTS.—All kinds of manufactured goods, the chief being iron, apparel and haberdashery, cotton goods and woollen goods. Also produce of the neighbouring colonies, such as flour, sugar, timber, and fruit. Also tea from China and India.

EXPORTS.—Wool is the staple export. Also—Gold, wheat, butter, skins and hides, flour, silver, lead, tin, beef, mutton, and timber.

TOWNS.—**Sydney**, upon Port Jackson, has a population of about 900,000, and is the capital and chief seaport in New South Wales. It is claimed that the trade of Sydney is greater than that of any other city in the Southern Hemisphere. The city is beautifully situated, and possesses many fine buildings, most of which are of recent erection. The harbour of Sydney is very safe and has ample accommodation for the largest ships. From Sydney all the chief railway lines stretch to the south, west, and north, connecting all the chief towns with the capital.

Broken Hill (26) is a town of very recent growth, having sprung up in connection with the wonderful silver mines of the **Barrier Range** in the extreme west. A railway conveys the silver-ore to Adelaide.

Newcastle, on the Hunter River, has 88,000 inhabitants, and is the second seaport. Up to comparatively recent years this port had greater commerce than Sydney. Newcastle is situated in the chief coal district of Australia, and has a large export trade.

Parramatta (15), on Parramatta River, a creek of Port Jackson, is famous for orange-growing.

Goulburn (12) is in an important agricultural district.

Bathurst (10) is situated on the plateau, and is the centre of a great wheat-growing district.

Maitland (12) is a rising town on the railway between Sydney and Brisbane, and is situated in a flourishing district.

Albury and **Wentworth** are river ports on the Murray.

Wollongong, to the south of Botany Bay, is the third port, and exports the coal from the southern coal-field.

POPULATION (1921).—2,099,000, or about 6·7 to a sq. mile.

The great bulk of the people are of British extraction.

The Chinamen are diminishing in number, owing to the poll-tax of £100 on each Chinese immigrant.

Lord Howe's Island and **Norfolk Island**, lying to the eastward in the Pacific Ocean, are dependencies of the colony.

QUEENSLAND

POSITION.—Under the name of Moreton Bay, this colony formed part of New South Wales until 1859, when it was created a separate colony by an order of Her Majesty in Council.

It comprises the north-eastern portion of Australia, with the adjacent islands in the Pacific Ocean and in the Gulf of Carpentaria. The northern half of the colony is situated in the tropics and the southern half in the south temperate zone.

BOUNDARIES.—North and east by the Pacific Ocean. West by long. 138° E. to 26° S. lat. and by 141° E. from 26° S. to 29° S. South by 29° S. lat., from 141° E. long. to the river Macintyre, then that river and a spur of the **Great Dividing Range** which touches the coast at Point Danger.

SIZE.—Area, 670,500 sq. miles, or $5\frac{1}{2}$ times as large as the British Isles.

Greatest length from north to south, 1,300 miles.

Greatest breadth from east to west, 800 miles.

RELIEF.—A very large part of the colony is filled with the great eastern plateau of Australia, which slopes into plains in the south-west and towards the Gulf of Carpentaria, and these slopes determine the direction of the rivers. The **Dividing Range** passes from north to south across the plateau at a distance of from 100 miles to 200 miles from the coast, and is joined by various ranges from the west and from the east. On the west are the **McKinlay**, **Selwyn**, and **Kirby Ranges**. On the east are **Peak**, **Drummond**, and **Expedition Ranges**.

The highest peaks are Mounts **Bellenden Ker**, 5,500 ft., and **Dalrymple**, 4,250 ft., both in the **Coast Range**, which runs parallel with the coast, at a distance of about fifty miles from it, almost throughout the colony.

The **Darling Downs**, in the south-east, have an area of over 25,000 sq. miles and a height of nearly 2,000 ft., and form very fine grazing grounds, watered by the **Condamine** and other sources of the river Darling.

COAST LINE.—The coast of the Gulf of **Carpentaria** is generally very low and unbroken, and is bordered by the mangrove swamps so common in tropical countries. The whole of the east coast is bordered by the **Great Barrier Reef**, which extends northwards to New Guinea and almost blocks Torres Strait.

The total length of coast is 2,250 miles.

For a description of the Great Barrier Reef, see chapter on Australia. }

HARBOURS.—The river mouths generally form good harbours, and there are numerous deep openings along the eastern coast.

The chief are **Moreton Bay**, 40 miles long by 17 miles wide, and receiving the **Brisbane River** and several smaller rivers, **Hervey Bay**, **Repulse Bay**, and **Halifax Bay**. **Thursday Island**, in **Torres Strait**, has a good harbour and is much frequented by ships.

ISLANDS.—Numerous islands skirt the eastern coast of Queensland and stud the channel between the colony and **New Guinea**.

The chief are **Stradbroke**, **Moreton**, and **Great Sandy**, on the east; **Wellesley Islands**, in the **Gulf of Carpentaria**; **Prince of Wales Island**, **Thursday Island**, **Banks Island**, and many others in **Torres Strait**.

Thursday Island is much frequented by passing vessels on account of its good harbour.

CLIMATE AND RAINFALL.—Lying largely in the tropics, Queensland has a high temperature, and round the coasts a heavy rainfall. The heat is, however, modified by the elevation of so much of the surface. This circumstance has an important effect on the vegetable productions. The rain falls chiefly in the summer months, averaging from about 73 inches at **Brisbane** to less than 2 inches at some western inland places. At certain spots on the east of the mountain range the amount reaches even 160 inches. Owing to the occasional extreme heaviness of the rainfall, the rivers are liable to a very sudden increase in depth, sometimes causing much destruction by inundations. The climate is generally healthy and favourable to Europeans.

RIVERS.—These are in three divisions:

(a) Those draining into the Pacific, the chief being the **Brisbane**, **Burnett**, **Fitzroy**, and **Burdekin**.

The two last-named have very considerable basins, and the **Fitzroy** is navigable for 35 miles.

(b) Those draining the interior and flowing into the **Darling**, as the **Warrego** and **Condamine**; also the continental rivers, such as the **Barcoo** or **Cooper's Creek**, flowing into **Lake Eyre**, and the **Diamantina**, which forms very extensive marshes after entering **South Australia** and also enters **Lake Eyre**.

The western rivers, in dry weather, either quite disappear by evaporation or shrink into a succession of water-holes.

(c) Those flowing towards the north, the chief being the **Flinders** and the **Mitchell**.

FERTILITY OF SOIL.—The best soil is upon the elevated region, which is largely of volcanic origin. The settled districts are round the coast for a distance of about 30 miles inland, and

having an area of about 100,000 sq. miles. The unsettled regions amount to over 500,000 sq. miles. Only a very small fraction of the settled district is actually under cultivation, but there is a great extent of grass-land. Irrigation by water from Artesian wells is rapidly becoming the custom in dry districts.

PRODUCTS.—1. **Vegetable.**—These are very varied in consequence of—(a) the extension of the colony towards the Equator; (b) the elevation of a large portion of the surface.

About one-half of the colony is covered by natural forest, in which are trees of species different from those found in other parts of Australia, *e.g.* palms, chestnut, and cedar trees, and others bearing a resemblance to the trees of Malaysia.

The leading crops are **maize and sugar-cane**, and, in addition, all the chief products of New South Wales and Victoria. Besides these are arrow-root, cotton, ginger, coffee, bananas, oranges, pine-apples, and other tropical and sub-tropical products. The grape grows freely and some wine is made. A large quantity of timber is cut every year.

Two crops of maize may be reared in a year. The tropical plants flourish in the coast regions; the cereals and fruits of temperate climates flourish on the table-lands.

2. **Animal.**—**Sheep and cattle** with their products—viz. tallow, frozen and tinned meat, wool, hides, and skins.

The number of sheep in 1921 was over 18,000,000; there were also over 7 millions of cattle, and over three-quarters of a million of horses. Many fat cattle are exported to South Australia and Victoria.

3. **Mineral.**—The mineral wealth of Queensland is very large and varied; but mining industry is, as yet, in its infancy, except as regards gold. The chief gold mines are at **Gympie** and **Mount Morgan**. Coal is also abundant and the output considerable. Copper, tin, silver, lead, quicksilver, and iron are also existent, and worked to a certain extent.

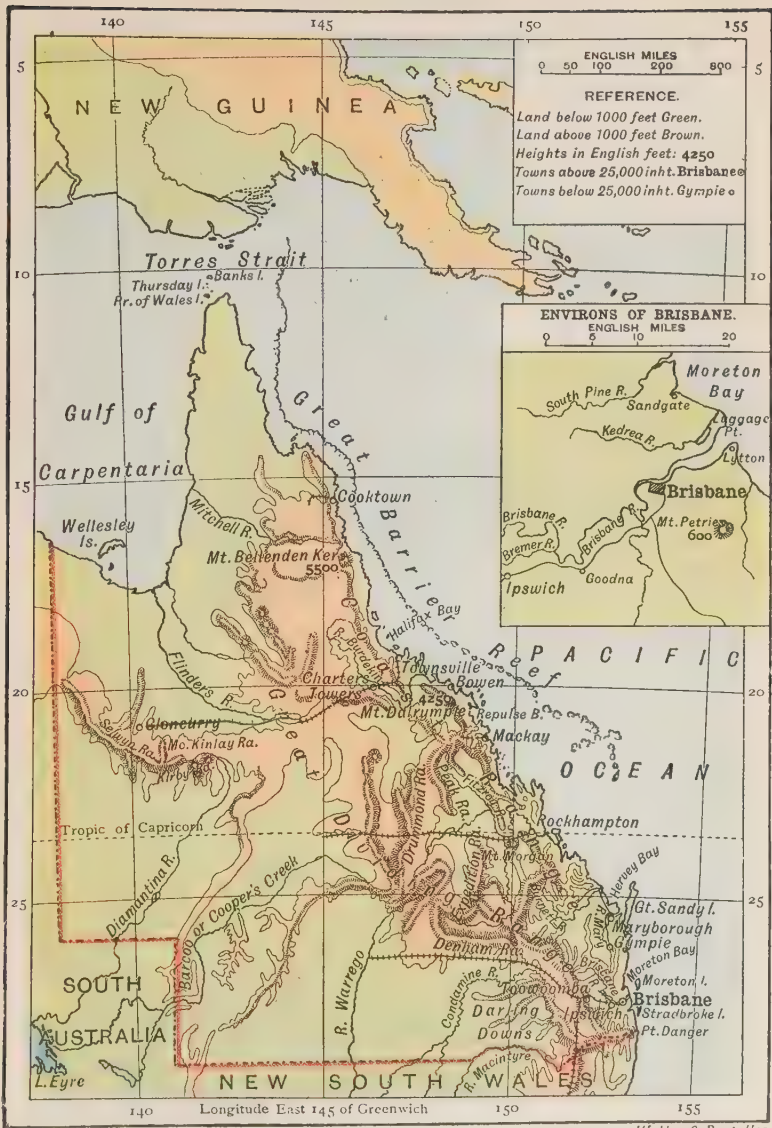
MANUFACTURES.—None of the manufacturing industries of Queensland have yet attained any importance.

Trade.—With its great length of coast line and its many excellent harbours, Queensland has great advantages for commerce. Till a few years ago the foreign trade was mostly through Sydney, but direct intercourse between Queensland and foreign countries is rapidly extending. The commerce is almost wholly with the other Australasian Colonies and with the United Kingdom.

INTERNAL MEANS OF COMMUNICATION.—In 1922 there were 5,799 miles of railway opened for traffic, all being the property of the State. Communication by road and river is not good, the roads being mostly only tracks, and the rivers too variable in volume for navigation.

IMPORTS.—Textile fabrics, metal goods, liquors, provisions, grain, and flour.

FIG. 269 — QUEENSLAND.



Walker & Bouallse

Longmans & Co. London & New York,

EXPORTS.—Gold, silver, copper, tin, wool, sugar, frozen meat, tallow, hides, and skins, also pearl-shell, preserved meat, &c.

In 1921-22 the total value of the imports was £8,000,000, and of exports £17,000,000 (excluding specie).

Towns.—**Brisbane** (within a ten-mile radius over 209) is situated about 500 miles north of Sydney, on the banks of the river **Brisbane**, twelve miles from its mouth. It is the capital and chief trading centre in the colony and has numerous industries. Very large vessels can load at the wharves. This city has suffered very severely in recent years from inundations caused by the sudden rising of the river as a result of heavy rains.

Rockhampton (24), on the **Fitzroy** River, is the chief port and town of Central Queensland. Vessels of moderate size can discharge at its wharves.

Maryborough (14), on the **Mary** River, 180 miles to the north of Brisbane, has sugar refineries and iron foundries, and is surrounded by a prosperous agricultural district.

Townsville (20), about 870 miles from Brisbane, is the chief town in Northern Queensland, and is the port for sugar-growing, grazing, and mining district.

Gympie (6), on the **Mary** River, 100 miles from Brisbane, is a very important mining town, having over 1,200 gold miners.

Ipswich (20), 12 miles from Brisbane, is the second oldest town in Queensland. It has saw and flour mills and some woollen factories, foundries, &c.

Toowoomba (20), lies on the Darling Downs, about 100 miles west of Brisbane, and is the largest inland town in Queensland.

Charters Towers (9), a mining town, lying to the south-west of Townsville.

POPULATION.—757,000 in 1921, or a few over 1 per sq mile.

SOUTH AUSTRALIA

POSITION AND BOUNDARIES.—South Australia is the great central section of Australia. It extends from the north coast to the south coast, and consists of South Australia Proper and the Northern Territory, the latter being much the larger.

The **western** limit is 129° E. long.; the **eastern** limit is 138° E. long. from the Gulf of Carpentaria to 26° S. lat., and south of this 141° E. long. forms the boundary. The boundary between South Australia Proper and the **Northern Territory** is along the parallel of 26° S. lat. On the **north** is that part of the Indian Ocean which is called the **Arafura Sea**, and on the **south** is the **Southern Ocean**.

South Australia contains lofty mountains, sandy deserts, and inland seas; a climate like that of Spain; scenery of the Highlands in places; deserts like Arabia for bleakness, aridity, and heat; chains of salt-lakes in a district equal in size to England; marshes and swamps; rocky precipices, chasms, and waterfalls; extinct volcanoes and interesting caves.

SIZE.—Area, 380,070 sq. miles.

Length from north to south, from 1,500 to 1,900 miles.

Breadth from east to west, from 600 to 700 miles.

RELIEF.—The greater part of the surface is low table-land of an elevation of about 1,000 ft., with some short mountain-ranges and scattered elevations. In the south-east and in the north the land is low. A study of the geology, fauna, and flora of the eastern and western sides of Australia leads to the assumption that a separation formerly existed between these two portions of the Continent; the dividing channel stretched between the Gulf of Carpentaria and the great gulfs of South Australia. Much of the surface in this tract is now either shingly or sandy desert, or has deep depressions containing salt lakes—viz. **Eyre, Amadeus, Torrens, Gairdner, and Frome.** These lakes vary very much in extent from time to time, according to the rainfall in the mountains from which the feeding rivers flow.

The chief mountains are the **Macdonnell Ranges**, 3,000 to 4,000 feet, in the centre of the colony, and the South Eastern Range lying east of the Spencer and St. Vincent Gulfs, and known as **Mount Lofty** in the south and **Flinders Range** in its northern part. The highest peak in this range is **Mount Brown**, 3,000 ft., at the head of Spencer Gulf. **Gawler Range** lies to the south of Lake Gairdner. In the northern plain are some low hills.

DESERTS.—The table-land of South Australia and Western Australia is mainly sterile, and bears the names of **Sandy Desert, Great Sandy Desert, and Great Victoria Desert** in various parts. Between the river **Diamantina** and **Cooper's Creek** is the **Great Stony Desert.**

COAST LINE.—In the north this is low and much indented, with mangrove swamps in many places. The chief **Openings** on the north are **Queen Channel, Van Diemen Gulf, and Gulf of Carpentaria.**

Islands are numerous off this coast. The largest are **Melville Island**, separated from the mainland by **Dundas** and **Clarence Straits**, and **Groot Eylandt** in the Gulf of Carpentaria.

The **south coast** extends over 12 degrees of longitude and is 1,600 miles in length. From the western boundary, for many hundreds of miles, is a sandy beach backed by high unbroken cliffs, which reach eastward to **Spencer Gulf** and form the shore of the **Great Australian Bight.**

This is a most dreary coast, and possesses not one harbour or cove suitable for shipping. The inland country is an exceedingly dry desert, in which the first explorer, **Eyre**, suffered terrible privations while journeying from **Adelaide** to **Albany.**

FIG. 270 — SOUTH AND WESTERN AUSTRALIA.



Spencer Gulf extends about 200 miles into the continent, and has many bays and harbours on its coasts. **St. Vincent Gulf** is separated from Spencer Gulf by **Yorke Peninsula**, and is also of great extent. **Kangaroo Island** lies at its mouth.

In the **south-east** a long line of sand dunes forms the coast of **Encounter Bay** and is continued in the sandy bar at the mouth of the Murray, which communicates with the sea in the following remarkable manner : passing from the ocean through the narrow entrance to the right lies a long narrow lagoon, **The Coorong** ; then through another narrow passage is the shallow **Lake Alexandrina** (24 miles by 14 miles), which receives the Murray, and connected with which, to the east, is **Lake Albert** (14 miles by 8 miles), also shallow and brackish.

CAPES.—The chief capes on the south coast are **Catastrophe** and **Spencer**, forming the western and eastern headlands at the entrance of Spencer Gulf.

CLIMATE AND RAINFALL.—The temperature varies from tropical heat in the north to warm temperate in the south. The great defect of the climate is its extreme dryness. The only parts receiving a rainfall sufficient for agriculture are a district about as large as England in the south-east, and the northern coast region, which receives tropical rains. The air is very pure and healthy, though hot north winds often cause discomfort in summer. The rainfall varies much in different years, but the internal regions never have much rain. Pleasant sea breezes often blow in the great southern gulfs. Snow very seldom falls even on the mountains, and the mountains nowhere reach the snow-line.

RIVERS.—The lower course and mouth of the **Murray** are in South Australia, and a natural means of communication with the interior is thus provided.

Northern Rivers.—Many of the northern rivers have a good volume, and are navigable for considerable distances.

The **Victoria River** is the chief. It flows into **Queen Channel**, and is navigable for large vessels for 50 miles and for small vessels another 60 miles.

Others are the **Daly**, **Roper**, **Adelaide**, and **Alligator**.

Continental Rivers.—The lower courses of the **Diamantina** and **Cooper's Creek**, which flow from Queensland and end in Lake Eyre ; and the **Finke**, which flows from the Macdonnell Ranges and disappears in the desert.

SOIL.—Only a very small proportion of the soil is of sufficient natural fertility for cultivation owing to the lack of rain. Irrigation by Artesian wells is practised in the low-lying districts, and near such of the rivers as are capable of being used for this

purpose. Considerable districts, though unfit for culture, afford good pasturage. Less than one-half per cent. of the surface is under cultivation.

PRODUCTS.—1. Vegetable.—Wheat. South Australia is the chief wheat-growing district of Australia, and the wheat is of remarkably fine quality. The other most important crops are the **grape, grass,** and **fruits** of both temperate and tropical climates. Cotton, ginger, sugar, and other tropical products are grown in the north.

FIG. 271—SPENCER GULF AND NEIGHBOURHOOD.



2. Animal.—As in other parts of Australia, **sheep, cattle,** and **horses.** In 1921 there were nearly 6,400,000 sheep, about 376,000 cattle, and over 270,000 horses. Very large districts are held under pastoral leases for grazing purposes. **Camels** are used to a considerable extent in the north.

3. Mineral.—**Copper** has been, and is, worked at many places, of which the most famous are **Burra-Burra** and **Moonta.**

Silver, lead, and gold are also widely distributed.

Some **brown coal** has been discovered.

MANUFACTURES.—About 30,000 persons were occupied in 1921 with manufacturing industries, of which the chief are **iron** and **brass smelting** and **agricultural implement making.**

TRADE.—The trade is almost equally divided between the United Kingdom and the adjacent colonies, only a small portion being with foreign countries. The value per head of the total commerce is very high.

MEANS OF COMMUNICATION.—South Australia is well supplied with roads, the revenue derived from the sale of public lands having been for many years devoted to public works. There are over 2,357 miles of railway open for traffic, all State property, and an extensive telegraph and telephone system. The great overland telegraph line is from **Adelaide** to **Port Darwin**, and is about 2,000 miles in length. Another line connects **Adelaide** with **Albany**, in Western Australia. The great trans-Continental railway linking up **Kalgoorlie** with **Port Augusta** was opened in 1917. The river **Murray**, in South Australian territory, varies from 12 to 40 ft. in depth, with a good width, and is thus an excellent waterway during the greater part of the year.

IMPORTS.—Manufactured goods of all kinds from the United Kingdom, especially iron and machinery, cotton and woollen goods, and wearing apparel; also British colonial produce.

EXPORTS.—Wheat and flour, wool, fruits, copper-ore.

TOWNS.—**Adelaide** (about 260 with suburbs), the capital, is situated on a plain to the east of St. Vincent Gulf and is about 7 miles from the sea. Its port is **Port Adelaide**, which has important mail traffic.

Port Augusta is at the head of Spencer Gulf and **Port Pirie** on the east side. This latter port is the place of export for the produce of the famous Broken Hill silver mines in New South Wales.

Palmerston, on **Port Darwin**, is the chief town in the Northern Territory. It is the terminus of the overland telegraph and of two European cables.

Burra-Burra and **Moonta** are mining towns in the south.

POPULATION.—About 495,000, excluding the Northern Territory, or over 1 to 2 sq. miles.

WESTERN AUSTRALIA

POSITION AND BOUNDARIES.—This colony embraces the whole of Australia west of 129° E. long. It is bounded by the Indian Ocean on the west, **Arafura Sea** on the north, and the Southern Ocean on the south.

SIZE.—Estimated area, 975,920 sq. miles.

Greatest length, 1,450 miles from **Cape Londonderry** in the north to **Peak Head**, near **St. George's Sound**, in the south.

Greatest breadth, 850 miles from **Steep Point**, near **Dirk Hartog's Island**, on the west, to 129° E. long.

The occupied portion is about 600 miles from north to south, with an average breadth of 150 miles, lying along the western coast.

RELIEF.—A strip of low land of varying width lies along the coasts, and the interior is occupied with the table-land, which also fills the greater part of South Australia. The low land extends inland to the borders of South Australia in about lat. 20° S. The western edge of the table-land is bordered by low ranges of hills, which, in places, very closely approach the sea. In the south-west these are called the **Darling Range**, and attain a height of over 3,000 ft. Numerous short ranges and detached hills are scattered over the plateau, of which **Hamersley Mountains** are 4,000 ft. high and **Mount Murchison** is 1,600 ft.

COAST-LINE.—In the north and north-west the coast is much indented, and has numerous small islands lying near. The chief openings on these coasts are **King's Sound** and **Cambridge Gulf**. The remaining coast is unbroken, with the exception of **Exmouth Gulf**, **Geographe Bay**, **Shark Bay**, and **King George's Sound**. Between the north-west coast and Timor Island is **Timor Sea**.

CAPES.—**Leeuwin** and **Naturaliste** in the south-west, **North-West Cape**.

CLIMATE AND RAINFALL.—The south-west receives a sufficient rainfall, brought by ocean winds, which counteract the prevailing land breezes. The extreme north receives tropical rain. The great bulk of the Colony is very deficient in rainfall.

RIVERS.—**Swan River** (180 miles) is a torrent liable to severe floods, and is navigable for only a short distance from its mouth. The **Murchison**, **Ashburton**, **Fitzroy**, and **Gascoyne** all resemble the Swan in being navigable for very short distances.

SOIL.—In the south-west coast strip there is a good deal of fertile soil in the river valleys, and this is pretty generally the case along the north-west and north coasts, more especially in the district called **Kimberley**, along the river Fitzroy. On the western portion of the plateau large areas of grassy land exist suitable for pasture, and water is generally to be obtained by digging; but the half of the colony nearest to South Australia is exceedingly dry, and mostly very barren.

PRODUCTS.—1. **Vegetable.**—Wheat, barley, oats, hay, grapes, and hard timber from the Eucalyptus, of which there are many species, different from those of the east of Australia.

2. **Animal.**—As in the other Australian Colonies—sheep, cattle, and horses; about 6,500,000 sheep and about 1,000,000 cattle.

3. **Mineral.**—Gold is the chief mineral worked,

Silver, lead, tin, and coal have also been found and worked to a small extent.

TRADE.—Imports.—Iron, apparel, beer and ale, cotton goods, machinery, and leather.

Exports.—Wool, wheat and flour, gold, timber, hides and skins, fruit, pearls and pearl-shell, sandal wood.

Railways.—There were 3,538 miles of railway open in 1922, including a branch from Perth to the goldfields at Kalgoorlie and Coolgardie, about 360 miles. Also the Trans-Continental railway from Kalgoorlie to Port Augusta in South Australia.

TOWNS.—Perth, on Swan River, the capital, in 1921 had a population of over 154,000. Fremantle, 25,000, is a calling port for mail steamers.

POPULATION.—About 332,000 in 1921, or about 1 to 3 sq. miles.

PEOPLE.—The aborigines are comparatively numerous, nearly 6,000 being employed in the colony, while an unknown number roam over the great plains.

EXAMINATION PAPERS

- A. 1. Name the colonies in Australia, state their internal boundaries and their respective areas.
2. Name the mountain ranges and peaks in Victoria, and contrast the mountain system with that of New South Wales.
3. Name (1) the general vegetable and animal products of importance; (2) the most important in each colony.
4. Name the five capitals, indicating their position and arranging them in order of size; also state position and any striking fact concerning Geelong, Bathurst, Newcastle, Gympie, and Albany.
- B. 1. Describe the table-lands of Queensland and of West Australia, showing clearly any differences.
2. Describe the river Murray, indicating its sources, nature of its current, together with the advantages and disadvantages of the river commercially. Draw a sketch-map of the basin of the river.
3. Name the chief general exports of Australia, and also any that are confined to one or more of the colonies.
4. State the position and any facts of interest respecting Broken Hill, Parramatta, Wollongong, Norfolk Island, Thursday Island, Moreton Bay, Stradbroke Island, Ipswich, Maryborough, and Port Darwin.
- C. 1. Describe the climate of Australia—(1) in general terms; (2) giving local peculiarities, with the causes of the same.
2. Show the divisions of the surface of New South Wales, and name the mountain ranges.
3. Contrast the east coast of Australia with that of (1) the south, (2) the north.
4. The amount of trade per head of population in Australia is very high. Explain the causes of this.

TASMANIA

POSITION AND BOUNDARIES.—**Tasmania** is an irregularly shaped island lying to the south of Australia, and separated from **Victoria** by **Bass Strait**, which is about 120 miles wide. The island lies between the parallels of $40\frac{1}{2}^{\circ}$ and $43\frac{1}{2}^{\circ}$ S. lat., and between $144\frac{1}{2}^{\circ}$ and $148\frac{1}{2}^{\circ}$ E. long., and corresponds in latitude with Northern Italy in northern latitude. Tasmania is washed on the east by the **Pacific Ocean**, and on the west by the **Southern Ocean**.

The colony includes several islands lying in Bass Strait and around the coasts.

SIZE.—**Area**, 26,215 sq. miles, of which 1,728 sq. miles are the area of the adjacent islands.

Tasmania is more than one-fifth the size of the British Isles, but is only about $\frac{1}{120}$ th of the area of Australasia.

Greatest length, 230 miles from north to south.

Greatest width, 190 miles from east to west.

RELIEF.—The formation of the island is similar to, and is a continuation of, the great Eastern Plateau of Australia, consisting of a table-land of a height of 2,000 ft. to 3,000 ft., with numerous chains of lofty hills running across it. The chief mountain ridge is in the centre, and runs from south to north-west. Some high hills, amongst which is **Ben Lomond**, 5,000 ft., occur in the north-east; but, as a rule, the west and centre have a greater elevation than the east. The elevation of the surface has an important effect upon the nature of the rivers and upon the climate.

The chief heights are **Ben Lomond** and **Cradle Mountain**, over 5,000 ft., **Wellington** and **Frenchman's Cap**, over 4,000 ft.

COAST-LINE.—Generally bold, with high rocky capes, and indented in a most remarkable manner in the south-east. The chief openings are **Storm Bay** in the south-east, receiving the **Derwent River** and having the curiously shaped **Tasman's Peninsula** on the east; **Oyster Bay** in the east; **Port Dalrymple** in the north, receiving the **Tamar River**; **Macquarie Harbour** in the west.

ISLANDS.—**Bruni** (or **Bruny**) in the south-east, separated from the mainland by **D'Entrecasteaux Channel**; **Maria** in the east; **Flinders** and **Cape Barren Islands** in the west of Bass Strait.

CLIMATE AND RAINFALL.—The climate is warm temperate, modified by the height of the surface in the higher parts of the plateau. It is generally very healthy and pleasant, and

hot Australian winds are very rare. The range of temperature is small, the difference between the summer and winter average being less than 20°. In the valleys and lower plains snow never lies long, but large quantities fall on the mountains and lie for many months. The rainfall is abundant in winter, and sufficient for agriculture throughout the year. The rainfall is greater in the west than in the east.

RIVERS.—The rivers are mostly torrential in character, finding their way to the sea through deep gaps, and being navigable only in their estuaries. The **Tamar** receives the **North** and **South Esk**, and flows into the north coast, forming a long estuary. It is navigable for large vessels to **Launceston**, 40 miles from the sea. The **Derwent** flows into Storm Bay, and is navigable 22 miles above Hobart. The **Huon** drains the extreme southern part of the island. The **Gordon**, **Pieman**, and **Arthur** flow into the west coast.

LAKES.—Lakes are numerous in the valleys of the interior, and contribute to the beauty of the scenery, which, by a combination of wooded hills, rapid rivers, and placid lakes, is often very charming.

The chief is **Great Lake**, 13 miles long and 8 miles wide.

The others, in order of size, are—**Sorrell**, **Crescent**, **St. Clair**, **Arthur**, and **Echo**.

SOIL.—The highest part of the plateau is bleak and not very fertile; but the valleys and the eastern plains are very productive, while the abundant rainfall has caused a large portion of the surface to be covered with luxuriant forests, which furnish most valuable timber and other forest products.

The abundance of timber has been a hindrance to the rapid development of the colony and to the making of communications.

PRODUCTS.—1. **Vegetable.**—All British cereals, wheat, barley, and oats, flourish; fruits, such as apples and pears, thrive remarkably; potatoes, hay, and hops are also largely grown.

Trees.—Some of the most valuable are the blue gum, huon pine, blackwood, and rosewood.

Trees producing gums and resin abound.

2. **Animal.**—**Native.**—As in Australia, the indigenous animals are mostly marsupials. The chief are the Tasmanian devil, the native tiger, kangaroos, wombats, duckbill, kangaroo rats, and opossums. There are three species of venomous snakes, and many lizards.

Domestic.—As in Australia, all British species. About 1,500,000 of sheep and 210,000 head of cattle.

3. Mineral.—Copper and tin the chief; silver and gold; iron is found, but is not much worked; coal, sometimes of good quality, exists in many places.

MANUFACTURES.—There are many small establishments for the manufacture of a variety of goods; but jam is almost the only manufactured product exported.

TRADE.—In recent years both imports and exports have steadily increased. The trade is chiefly with the other Australasian Colonies and with the United Kingdom.

MEANS OF COMMUNICATION.—Tasmania has about 637 miles of railway, the chief line being the Tasmanian Main Line connecting Launceston with Hobart, a distance of 133 miles.

Several lines of vessels afford communication with Europe, and there are many intercolonial and river steamers.

Imports.—Textile fabrics (cotton, woollen, and silk), iron and machinery, food and drinks.

Exports.—Copper, silver, wool, tin, timber, fruits and jams, hops, grain, hides and skins, bark.

PORTS.—The chief towns are seaports.

Hobart (52), the capital, situated upon the Derwent estuary, which affords passage to the largest vessels.

Launceston (26), at the head of the Tamar estuary, has the bulk of the trade.

Several small but flourishing towns exist in the interior, of which **Waratah**, in the north-west, is in a mining district.

GOVERNMENT.—Tasmania is a constitutionally governed colony, having a Governor, an Executive Council, a Legislative Council, and Legislative Assembly, as in the Australian Colonies. Tasmania now forms part of the Australian Commonwealth.

POPULATION.—In 1921, 214,000, or about 8 per sq. mile, almost entirely of British extraction.

The aborigines of Tasmania were a race resembling the Australian Negroes, but with curly instead of straight hair, and are now extinct. After many struggles with the settlers, they were removed with their own consent to Flinders Island in 1835, and lastly to Oyster Creek, on D'Entrecasteaux Channel.

EXAMINATION PAPER

- A. 1. State the position of Tasmania, showing its distance from Australia, New Zealand, and the Equator; its size, comparing it with Ireland; and its boundaries.

2. Describe the contour of the surface of Tasmania, fixing the position of the mountains, and naming the chief ranges and heights; and indicate the direction of the chief rivers, naming three.
 3. Make lists of the natural and other products of Tasmania. Compare the soil with that of New South Wales and West Australia.
 4. Write a brief account of the discovery, colonisation, and progress of Tasmania, giving as many dates as you can.
-

NEW ZEALAND

POSITION.—New Zealand consists of two large islands—viz. the North Island and the South Island, and a smaller one, Stewart Island, to the south, together with several groups lying at considerable distances.

New Zealand lies at a distance of about 1,200 miles to the south-east of Australia, and extends from $34^{\circ} 23'$ S. lat. to $47^{\circ} 19'$ S., with its central line pointing north-east and south-west. There is a space of nearly 13° of longitude between the most easterly and westerly points.

BOUNDARIES.—Pacific Ocean on all sides.

SIZE.—Area (excluding the islands), 103,568 sq. miles, of which 44,130 are included in the North Island and 58,120 in the South Island, the remainder making up Stewart Island and six groups included in the colony.

Greatest length, about 1,100 miles.

The North Island is 515 miles and the South Island is 525 miles in length.

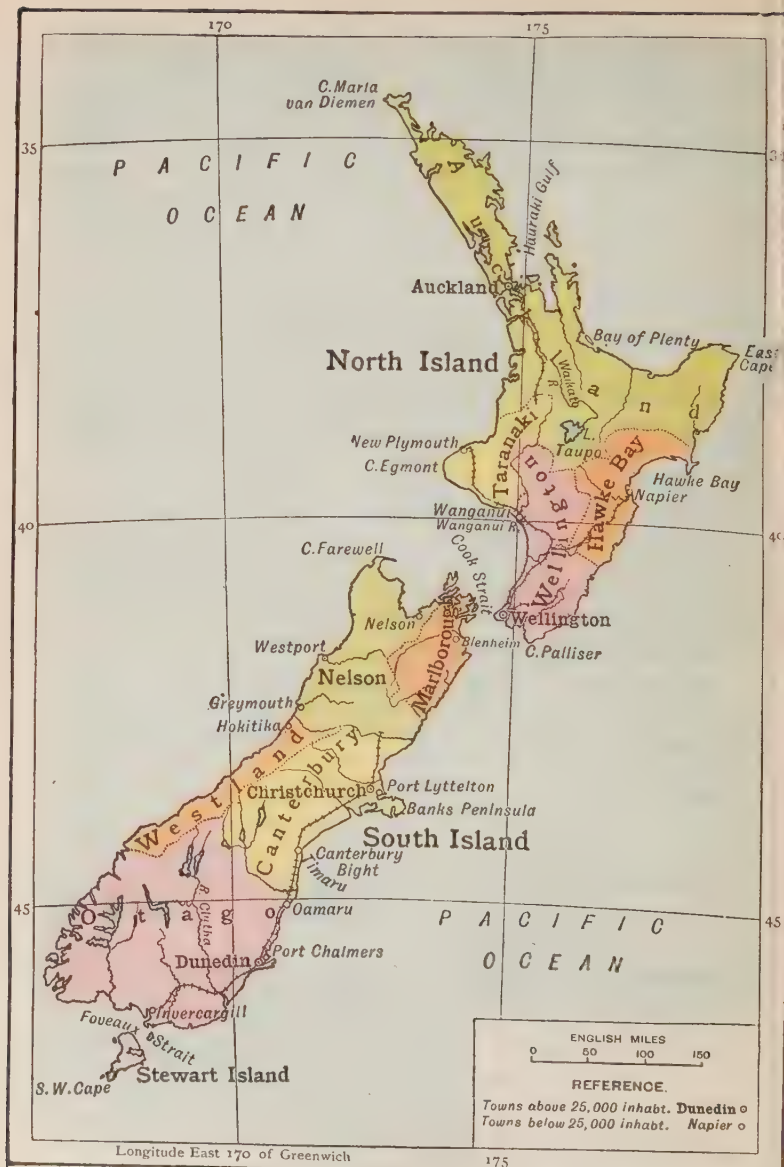
Greatest width, 250 miles, but the width is very variable, and the average is somewhat over 100 miles. No place is more than 75 miles from the sea.

RELIEF.—The surface of New Zealand is generally elevated, and is diversified by numerous lofty ranges, groups of mountains, and detached peaks, of which many are volcanic in origin.

The North Island.—The long, remarkably indented peninsula which extends for about 250 miles to the north-west is generally low. The wide portion of the island is chiefly occupied by a mountain region, which is bordered by a strip of low land, mostly narrow, but in places of considerable width.

The South Island.—The mountains approach the sea in the

FIG. 272.—NEW ZEALAND: PROVINCES, &c



west, and for long distances form the coast line, but in the east lies an extensive stretch of level land known as the **Canterbury Plains**, 160 miles in length, and affording the best grazing land in the colony.

Stewart Island is entirely of elevated surface, and is covered with forest.

MOUNTAINS.—The **North Island**. Chief Ranges : **Te Whaiti**, **Kaimanawa**, and **Ruahine**.

Highest Peaks: **Egmont**, 8,300 ft., rising from the rich plains of the south-west.

This is an extinct volcano, and is snowclad at summit. It is exceedingly beautiful.

Ruapehu, over 9,000 ft., is an extinct volcano, with a crater lake at the summit 500 ft. in diameter.

This lake is inaccessible except by ropes.

Tongariro is an active volcano with three volcanic cones, the last having been formed in 1868. Vast streams of lava have flowed down the sides of this mountain. The highest crater is called **Ngauruhoe**, 7,500 ft.

The line of volcanic formation passes from **Ruapehu** through **Tongariro**, and the boiling springs to **White Island**, an active volcano in the **Bay of Plenty**.

The South Island.—A range runs through the whole length of the island, generally nearest to the west, and is known in its central and highest portion as the **Southern Alps**. Many of these mountains reach a height of over 10,000 ft. above sea level, and contain great glaciers, of which the largest is **Tasman Glacier**.

Peaks.—**Cook**, 12,350 ft. ; **Earnslaw** and **Aspiring**, each over 10,000 ft.

The **Tasman Glacier** is eighteen miles long and over one mile in average width, and is larger than the **Aletsch Glacier** in Switzerland.

THE VOLCANIC REGION.—The volcanic forces of the **North Island** are manifested in the lava streams from **Mount Tongariro** and in the hot springs, which are present in vast numbers. These springs exist from **Tongariro** to almost the extreme north of the island ; but they are most numerous near **Lake Rotorua**, in what is known as the **Hot or Thermal Springs District**.

This district has an area of about 1,000 sq. miles, being 50 miles long and having an average width of 20 miles. The whole region abounds in hot springs of very varying properties, mud volcanoes, solfataras, and fumeroles.

Until 1886 the famous white and pink terraces were amongst the wonders of the world, but they were destroyed by a volcanic eruption in that year. A portion of the Hot Springs District has been reserved by the Government as a sanatorium.

RIVERS.—There are many good rivers in New Zealand ; in the **North Island** flowing to all coasts, and in the **South Island** generally to the east and south-east.

The North Island.—River **Waikato**, draining Lake **Taupo** and flowing to the north-west, navigable by small steamers for 100 miles.

River **Thames** or **Waiho**, navigable for 50 miles.

The South Island.—River **Clutha**, about 170 miles, the longest river in New Zealand, draining three large lakes.

The rivers **Buller**, **Grey**, and **Hokitika**, on the west coast, all form harbours at their mouths, which have been much improved by dredging.

LAKES.—Very numerous. In the **North Island**: **Taupo**, 200 sq. miles in extent; **Tarawera** and **Rotorua**.

The South Island.—**Te Anau**, 132 sq. miles, the largest.

Wakatipu, 114 sq. miles, at an elevation of over 1,000 ft.

The mountain lakes of the South Island are all of glacial origin, and are very deep.

COAST LINE.—Very much broken, particularly in the north-west prolongation of the North Island and along the west coast of the South Island. This latter coast presents a very high front to the ocean, and is indented with numerous narrow fiords, which pierce the mountain system for long distances inland.

Banks Peninsula is a remarkable promontory on the east of the South Island, having several good harbours, of which **Akaroa Harbour** is the best.

The North Island has very numerous openings, but few good harbours.

The best harbours in the North Island are **Port Nicholson**, on which stands **Wellington**, and the **Harbour of Auckland**.

Manukau Harbour, on the opposite side of the island from **Auckland**, is shallow and its entrance is obstructed by a bar.

The total length of coast line of New Zealand is 4,330 miles.

OPENINGS.—**The North Island.**—**Bay of Islands**, **Hauraki Gulf**, **Bay of Plenty**, and **Hawke Bay**.

The South Island.—**Tasman Bay**, **Canterbury Bight**, **Milford Sound**, and **Golden Bay**.

The Sounds of the West Coast.—In the south-west of the South Island a section of the coast 120 miles in length has thirteen large openings, running inland amongst the mountains to a distance as great as 20 miles, and closely resembling the fiords of Norway.

Milford Sound, though not the largest, is the most famous. This opening has great mountains rising precipitously from its waters—**Pembroke Peak**, 6,700 ft., and **Mitre Peak**, 5,560 ft.

The **Sutherland Fall** in three leaps falls 1,904 ft., and **Bowen Fall** is exceedingly grand.

The sounds are very deep, **Milford Sound** being 1,270 ft. at the head of the opening, while at its mouth the depth is less. Anchorage is difficult on account of the depth.

STRAITS.—Cook Strait, between the North and the South Islands, with a width of from 12 to 100 miles.

Foveaux Strait, between the South and Stewart Islands, 20 miles wide.

CAPEs.—The North Island.—Maria Van Diemen, East, Palliser, and Egmont.

The South Island.—Farewell, West, East Head, and Campbell.

Stewart Island.—South-West Cape.

Many of the capes are bold and striking headlands.

ISLANDS.—In addition to some small islands lying near the coasts, the colony of New Zealand embraces six groups, lying at distances of from two hundred to nearly seven hundred miles. These groups are the **Chatham, Auckland, Kermadec, Campbell, Antipodes**, and **Bounty** Islands respectively.

Chatham Islands, 480 miles east-south-east from Wellington, consist of two considerable and several smaller islands. These islands are hilly, and are partly covered with forest, but the greater part by grass or ferns. Sheep rearing is the chief occupation of the islanders.

Kermadec Islands, 600 miles east of Auckland, are of volcanic origin, and there is still some volcanic activity. The climate is mild and rainfall good. These islands are forest-clad.

Auckland Islands, 290 miles south of Bluff Harbour, have some fine harbours, of which **Port Ross** is a splendid harbour of refuge; and a depôt of provisions and clothing is maintained there for shipwrecked seamen.

The **Campbell Islands** are in lat. 52° 33' S. and long. 169° 8' W., and have an area of about 70 sq. miles.

The **Antipodes Islands** lie about 460 miles south-east from Port Chalmers, and have an area of 20 sq. miles.

The **Bounty Islands** lie to the north of the Antipodes Islands and rather nearer to Port Chalmers, and have an area of 5 sq. miles.

CLIMATE AND RAINFALL.—The climate is **warm temperate**. There are no extremes of temperature in the lowlands, but very severe winters, with much snow, are usual in the mountain regions. The average temperature of London is 7° lower than that of the North Island, and 1° lower than that of the South Island. The western coast is generally more equable in temperature than the east.

The **rainfall** is sufficient for agriculture in all parts, and is very abundant in the western parts of the islands. Thus the average amount at **Hokitika**, on the west of the South Island, is 112 inches, while at **Christchurch**, on the east, it is 28 inches. In the North Island, near **Mount Egmont**, the amount per annum is 58 inches, compared with 37 at **Napier**.

SPECIAL CAUSES.—1. The prevailing winds are from the north-west, and are rain laden.

FIG. 273.—THE NORTH ISLAND.



Walker & Bontall & Co.

Longmans & Co. London & New York.

FIG. 274.—THE SOUTH ISLAND.



Walker & Boutall &c

Longmans & Co. London & New York.

2. The presence of so vast a body of ocean on all sides modifies the heat of summer.

3. The great elevation of much of the surface lowers the temperature.

FERTILITY OF SOIL.—The soil of New Zealand is almost wholly fertile, and in many parts exceedingly so. Most of the land above 1,000 ft. is incapable of cultivation. Some of the soil is so fertile that several successive crops can be taken without need for manure.

The forest districts are cleared for agriculture by burning. The east central parts of the South Island consist of a plain covered only with grass, and can easily be ploughed. Further south are well-watered downs and plains suitable for pasture or agriculture.

PRODUCTS.—Vegetable.—Generally speaking, the vegetable life of New Zealand is most luxuriant, comprising numerous species of tree-ferns, many valuable timber trees, native flax, and some other roots. As in Australia, there is a remarkable lack of indigenous food plants.

The cereals and other food plants of **Northern Europe** flourish extremely well. The forests are mostly on the western side.

Forest Products.—Kauri, or yellow pine, with red and white pines, kauri gum.

The gum is obtained by digging on the sites of ancient forests in the province of Auckland, where several thousand persons, white and Maori, obtain a living by the industry.

Agricultural.—Wheat, oats, barley, and hay are the leading crops. Others are roots such as turnips, potatoes, pulse, and grasses.

Maize will grow very freely in the North Island, and also oranges, lemons, limes, and olives.

Grass seeds sown amongst the wood ashes after burning off the trees produce good pasture without plough or hoe.

Clover has been a profitable crop since the humble-bee was introduced into New Zealand, for this insect fertilises the flowers of the clover, so that the seed matures. Wheat growing is taking a secondary position, and farmers are paying more attention to dairy produce, poultry, fruit, &c.

Animal.—Sheep, cattle, horses, pigs, and poultry.

In 1922 there were 22,200,000 sheep, 3,300,000 cattle, 332,000 horses, and 354,000 pigs.

The superior rainfall causes grass to be abundant, and hence there is a large quantity of live stock and dairy produce.

Great quantities of mutton are now exported in vessels specially fitted with cold chambers.

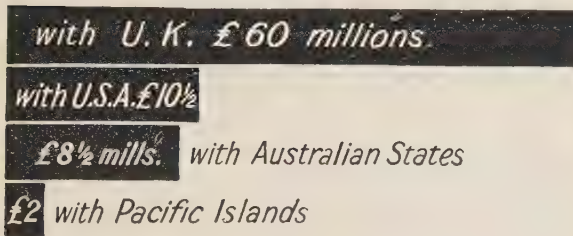
Fish.—Food fishes are very abundant and varied in species. Many of the species resemble those of the Bay of Biscay and the Madeiras. English trout have been introduced from Tasmania, and attain a great size.

Mineral.—Gold and coal are the only minerals largely worked. Silver, antimony, manganese, copper, lead, tin, and petroleum are all found, but are not extensively worked.

Gold was first found in large quantities in the south-east of the South Island, and later in the west, chiefly in alluvial deposits. In the North Island the gold is obtained by crushing quartz.

The coal of the South Island is of good quality, and is found in great quantities on the west of that Island.

FIG. 275.—DOMINION OF NEW ZEALAND: TRADE WITH OTHER COUNTRIES, 1921.



MANUFACTURES.—These show a steady growth, and about seventy thousand persons are employed. Woollen manufacture is one of the chief, but there are numerous factories for the making of miscellaneous goods, as hats, boots, saddlery, agricultural implements, carriages, &c., besides flour and saw mills, breweries, freezing works, &c.

TRADE.—Like that of the Australian Colonies, the total value of the commerce of New Zealand is very large relatively to the population, the chief occupation being the development of natural resources, and hence there is a large quantity of produce for export.

MEANS OF COMMUNICATION.—About 3,156 miles of railway, mostly owned and worked by the State. Railways have been constructed in advance of present wants, with the object of opening up new districts and inducing settlement. Roads are difficult to make, especially in the South Island, where land communication between the east and west of the island is tedious and dangerous, owing to the roughness of the mountain roads.

FINANCE.—Like most of the Australian Colonies, New Zealand has a heavy public debt, which has been raised for the purpose of making railways, docks, telegraphs, and other public works, but generally speaking the Colony is in a flourishing condition.

SEAPORTS.—The North Island.—**Auckland** has a good harbour for large vessels.

Wellington, on Port Nicholson, which is extensive in area and has deep water.

Napier, on Hawke Bay, has the only good harbour on a long stretch of coast, and has large exports.

The South Island.—**Port Lyttelton**, seven miles from Christchurch, is a commodious and convenient port, with much trade.

Dunedin and **Port Chalmers** are both upon Otago Harbour, which has a good depth of water, and has been improved by the construction of piers and sea-walls.

Invercargill, upon **New River Harbour**, and **Bluff Harbour** are convenient ports on the south of the island.

Greymouth, at the mouth of **Grey River**, and **Westport**, at the mouth of the **Buller**, have a rapidly increasing export of coal.

IMPORTS.—Clothing and materials for the same, iron and steel goods and machinery, and sugar are the chief. Others are books and paper, liquors, tobacco, tea, bags, and sacks.

EXPORTS.—Wool, frozen meat, butter and cheese, hides and skins, gold and kauri gum, timber, tallow, and rabbit-skins.

TOWNS.—As in Australia, the large towns are mostly on the sea-board. In 1921 there were five towns with more than 20,000 inhabitants—viz., **Auckland** (164), **Wellington** (110), **Christchurch** (110), **Dunedin** (73), **Wanganui** (24).

All these numbers are inclusive of suburbs.

Auckland is situated upon the narrow isthmus which joins the remarkable north-western peninsula with the main portion of the North Island. It was, until 1865, the capital of the colony, and is still the largest town.

Wellington, the capital of the colony, is centrally situated upon **Port Nicholson**, at the south end of the North Island.

Christchurch is an important town upon the fertile **Canterbury Plains** in the South Island, and is the centre of much commerce.

Dunedin is a flourishing town in the south-east of the South Island.

GOVERNMENT.—The legislative power is vested in the **Governor** and a **General Assembly**, consisting of two Chambers, the first called the **Legislative Council** and the second the **House of Representatives**.

In this House are the native representatives of the four Maori electoral districts, elected only by Maoris.

The title of the **Dominion of New Zealand** was adopted in 1907.

POPULATION.—In 1921 the population was over 1,218,000, not including Maoris, of whom there were nearly 52,000.

The **Maoris**, or aborigines, are a brown people of much higher intelligence than those of Australia or Tasmania. They show a considerable aptitude for European civilisation. For a long time they diminished in numbers, but the present tendency is towards increase.

RELIGION.—There is no State Church, and all sects have equal privileges.

EDUCATION in the elementary schools is free, secular, and compulsory. Secondary education in schools, colleges, and universities is partly supported by public funds.

EXAMINATION PAPERS

- A. 1. Describe the climate of New Zealand, giving any special causes for local peculiarities.
 2. Name the most important rivers of New Zealand, stating their direction and showing their navigability.
 3. Describe the general character of native plants in New Zealand, and name the most important crops.
 4. Give some account of the four largest towns.
 - B. 1. Describe as minutely as possible the Fjord Region of the South Island.
 2. Draw a sketch-map of New Zealand, inserting the chief mountain ranges and peaks, with their names.
 3. What are the chief industries and exports of New Zealand?
 4. Say what you can of Stewart Island, Lake Rotorua, Banks Peninsula, Cook Strait, and Chatham Island.
 - C. 1. Give an account of the Hot Springs District, stating its position, size, character, and use.
 2. Mention the chief harbours in New Zealand, and connect any special trades with them as far as possible.
 3. Where and what are Te Anau, Earnslaw, Port Ross, Canterbury Plains, Tongariro, Taupo, Maria Van Diemen, Foveaux Strait?
 4. Give an account of the Maoris; trace the colonisation; and briefly state the present government of New Zealand.
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THE ISLANDS OF THE PACIFIC

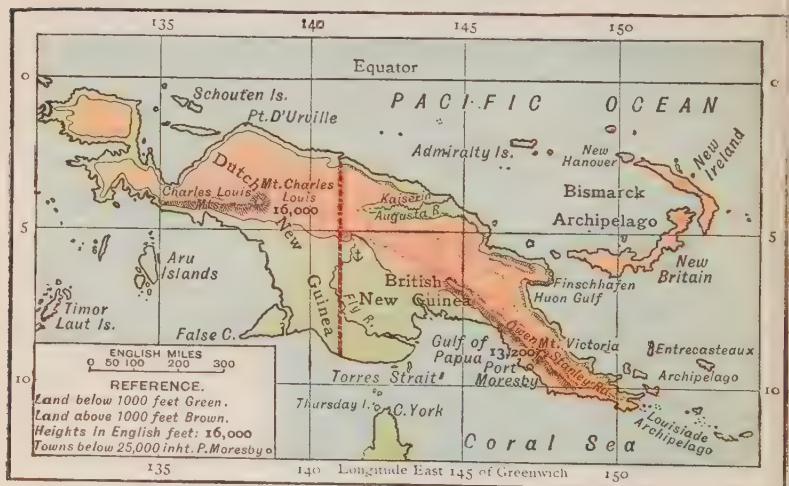
A convenient method of classifying the islands of the Pacific Ocean is to group those in which the inhabitants are descended from the same stock. Thus, the term **Australasia** is applied to Australia and Tasmania, the original inhabitants having been Australian Negroes; **Malaysia**, to the great group of islands lying

nearest to Asia and inhabited by Malays; **Melanesia** (meaning 'islands of the blacks'), to New Guinea and the neighbouring island groups inhabited by Papuans, a very dark race with curly hair; **Polynesia**, to the neighbouring islands, inhabited by races resembling the Malays.

Malaysia has been treated as a part of Asia.

Polynesia properly includes New Zealand, but that colony, on account of its importance, has been treated separately. **Melanesia** is also sometimes

FIG. 276.—NEW GUINEA, &C.



Longmans & Co. London & New York.

Walker & Bostall sc.

considered as a section of Australasia. The term **Oceania** is now little used by English geographers, but is applied by French geographers to all the above-named divisions.

Some of the Polynesian islands north of the Equator are subdivided under the name of **Micronesia**.

STRUCTURE OF THE ISLANDS

The larger islands are mostly mountainous in character, and often volcanic in origin.

The smaller islands are almost entirely of **Coral** formation, and these are much the most numerous. Many of the mountainous islands are partly or entirely surrounded by reefs of coral known as **Barrier Reefs**, which lie at some little distance and have deep-water openings. Others have reefs, called **Fringing Reefs**, directly touching their shores.

The **Coral** islands are all low, and frequently so formed as to enclose a lagoon with an opening on one side. Such islands are called **Atolls**. They sometimes have another reef lying at some little distance. These islands have been formed upon submarine mountains whose tops almost reach the surface of the ocean.

NEW GUINEA

POSITION.—Between S. lat. $0^{\circ} 25'$ and $10^{\circ} 40'$ S. lat.; between E. long. $130^{\circ} 50'$ and $150^{\circ} 35'$.

SIZE.—Length, 1,490 miles. Greatest breadth, 430 miles. Area estimated at 306,000 sq. miles. Dutch New Guinea, 152,000 sq. miles; British New Guinea (or the Territory of Papua), 160,000 sq. miles.

New Guinea is thus the largest island in the world, if Australia be considered a continent. These figures are estimates, and only give an idea of the relative size.

SURFACE.—A range of mountains extends almost through the island from east to west. In the south-east this is known as the **Owen Stanley Range**, and reaches a height of 13,000 ft. It is also stated that a peak, **Mount Charles Louis**, in the western part of the island, is 16,000 ft. in height. Numerous rivers flow to the north and south coasts. Of these, the **Fly River** has been navigated for hundreds of miles, and is over 500 miles long.

COAST.—The south coast is precipitous in many places, and covered with dense forests. The north is lower, and has large expanses of level land stretching inland.

CLIMATE.—Tropical and unhealthy to Europeans, especially between the monsoons. The heavy rains temper the heat of the north and west. The south-east monsoons are very strong, and bring much rain.

PRODUCTS.—1. **Vegetable.**—The natural **Flora** resembles that of Australia, and also of Malaysia. Dense forests of enormous trees cover large tracts, and great reeds and grasses flourish. Cocoa and sago palms, sandal-wood, ebony, gums, and rattans are all valuable native products.

The cultivated plants are the banana, orange, sugar-cane, maize, taro, yams, cocoa-nut, tobacco, &c.

2. **Animal.**—Many marsupials, as in Australia. Pigs from European stock set loose by voyagers. Birds, such as Birds of Paradise and others of splendid plumage, very numerous. Snakes plentiful.

3. **Mineral.**—Bismuth, iron, limestone, plumbago, and some gold have been discovered.

POPULATION.—The **Papuans**, or 'frizzled people,' from the peculiar growth of their hair, inhabit all the island except the eastern extremity. They are a very dark people, resembling the natives of that part of Africa opposite to Aden. They are generally very degraded, though various tribes show different degrees of barbarism, with much variety of language and appearance. There are many who practise cannibalism and head-hunting.

The Torres Straits islanders are employed in the pearl fishery. The south-eastern people are Polynesians, and are of milder character than the Papuans. Many of the inhabitants of New Guinea live in houses raised upon piles driven into the beds of rivers or bays. Some have been Christianised by the efforts of missionaries.

DIVISIONS.—The western portion, as far as 141° E. long., has for many years been claimed by the Dutch as a possession. The remainder is a British Possession, and is under the control of the Commonwealth of Australia. It is called the **Territory of Papua**. The Central Court is at **Port Moresby**.

OTHER MELANESIAN ISLANDS.—The **Bismarck Archipelago** include the islands of **New Britain**, **New Ireland**, the **Admiralty Islands**, and others; are all under the Australian Government. Area, 19,000 sq. miles.

The **Solomon Islands** and the **Santa Cruz Group** were put under British protection in 1898.

NEW CALEDONIA AND THE LOYALTY ISLANDS belong to France, and the first-named is used as a French convict settlement. The chief town on the island is **Numea**. The **New Hebrides** are protected by Britain and France, but neither may form settlements. English missionaries have done much to convert and civilise the inhabitants of some of these islands, notably **Tanna**. Other groups are the **D'Entrecasteaux** and **Louisiade Islands**, lying close to the south-east of New Guinea. All these islands are inhabited by **Papuans**, and their products resemble those of New Guinea.

PRODUCTS.—Copra, tortoiseshell, sandal-wood, and cocoa-nut fibre are the most widely spread.

Copra is the dried kernels of cocoa-nuts.

NEW CALEDONIA, the chief French possession in the South Seas, has numerous dependencies—viz. Island of Pines, Loyalty Archipelago, Huon Islands, Chesterfield Islands, and Wallis Archipelago.

The **Area** of New Caledonia is 6,000 sq. miles, and its dependencies are about 1,700 sq. miles in addition. The population is about 60,000, and consists of French officials, soldiers, convicts,

freed criminals, and natives, the island being a Penal Colony. The chief products are nickel and chrome, cattle, wheat, maize, pineapples, coffee, sugar, cotton, and cocoa-nuts. The capital and chief town is **Numea** (or **Noumea**).

POLYNESIA

ISLANDS BELONGING TO, OR PROTECTED BY, BRITAIN.—Fiji Islands, with Rotumah, Cook's or Hervey Islands, Phoenix Islands, Lagoon or Ellice Islands, Christmas Island, Fanning Island, Gilbert Islands, Penrhyn Island, Pitcairn Island, Royal Company Island, Macquarie Island, Emerald Island, and a number of other groups and islets.

FIJI ISLANDS.—Situated in lat. 15° to 20° S. and long. 177° E. to 178° W. The group consists of about 200 islands, of which 80 are inhabited. The largest are **Viti Levu**, 4,250 sq. miles, and **Vanua Levu**, 2,600 sq. miles. The total area of the group is 7,083 sq. miles.

PRODUCTS.—Sugar, cocoa-nuts, bananas, cotton, maize, yams, tea, tobacco, horses and other domestic animals of European stock.

CLIMATE.—Very equable for the latitude, with a heavy rainfall.

POPULATION is estimated at 157,000, and consists of Fijians, Europeans, and Indian coolies.

The natives were formerly much addicted to cannibalism, but many of them are now Christians, chiefly Wesleyans and Roman Catholics.

The capital is **Suva**, in Viti Levu, with about 1,700 Europeans. **Levuka** is a seaport of some consequence. The Island of **Rotumah** is included in the colony.

GOVERNMENT.—The islands were ceded by the natives in 1874 and are now governed by a Governor, appointed by the Crown and assisted by the native chiefs, who are paid for their services.

The remaining islands acquired by Britain are valuable: (a) as coaling stations for naval and merchant vessels; (b) as stations on the existing and projected submarine cable routes; (c) for their stores of guano and abundance of cocoa-nuts.

They are nearly all of coral formation, and resemble each other in population and products.

PITCAIRN ISLAND is interesting from its connection with the mutineers of the 'Bounty,' who settled there.

ROYAL COMPANY ISLAND, MACQUARIE ISLAND, and **EMERALD ISLAND** lie far to the south of Australia.

The British possessions in Polynesia are under the jurisdiction of the High Commissioner of the Western Pacific, who is also Governor of Fiji.

Penrhyn Island, Fanning Island, and Christmas Island are important because of their position on the proposed line of telegraph from New Zealand to North America.

FRENCH ISLANDS.—In addition to the colony of New Caledonia, France possesses several islands in the South Seas. In Polynesia the chief are the **Society Islands**, **Marquesas Islands**, **Gambier Islands**, and **Kerguelen**.

Society Islands.—The chief of this charming group of islands is **Tahiti** (412 sq. miles), which has a considerable population of natives and Europeans, and is much visited by ships. The climate is delightful, and all kinds of tropical fruits abundant. The trade is chiefly carried on with San Francisco, the chief exports being pearls and pearl-shell, copra, and cotton. The capital is **Papeete**, which is laid out after the style of a modern French town.

The **Marquesas Islands** are inhabited by a much more warlike and independent race than the Society Islanders, and are very little influenced by European civilisation.

Kerguelen Island is a desolate island far to the south, valuable for its coal deposits.

OTHER ISLANDS.—**Caroline Islands**, **Marshall** and **Palao**s or **Pelew**, and **Marianne Islands**.—These islands lie north of the Equator, and are very numerous, extending over about 40 degrees of longitude. The Carolines are low and of coral formation, the others being hilly and volcanic. Bread-fruit and cocoa-nuts are the chief products. The **Carolines**, the **Pelew**, the **Marshall**, and **Marianne Islands** have been placed under the protection of Japan.

SANDWICH ISLANDS.—Annexed by the United States in 1898. This important group lies in about 19° N. lat., and nearer to North America than the other islands of Polynesia.

The area is 6,449 sq. miles, and population 255,000.

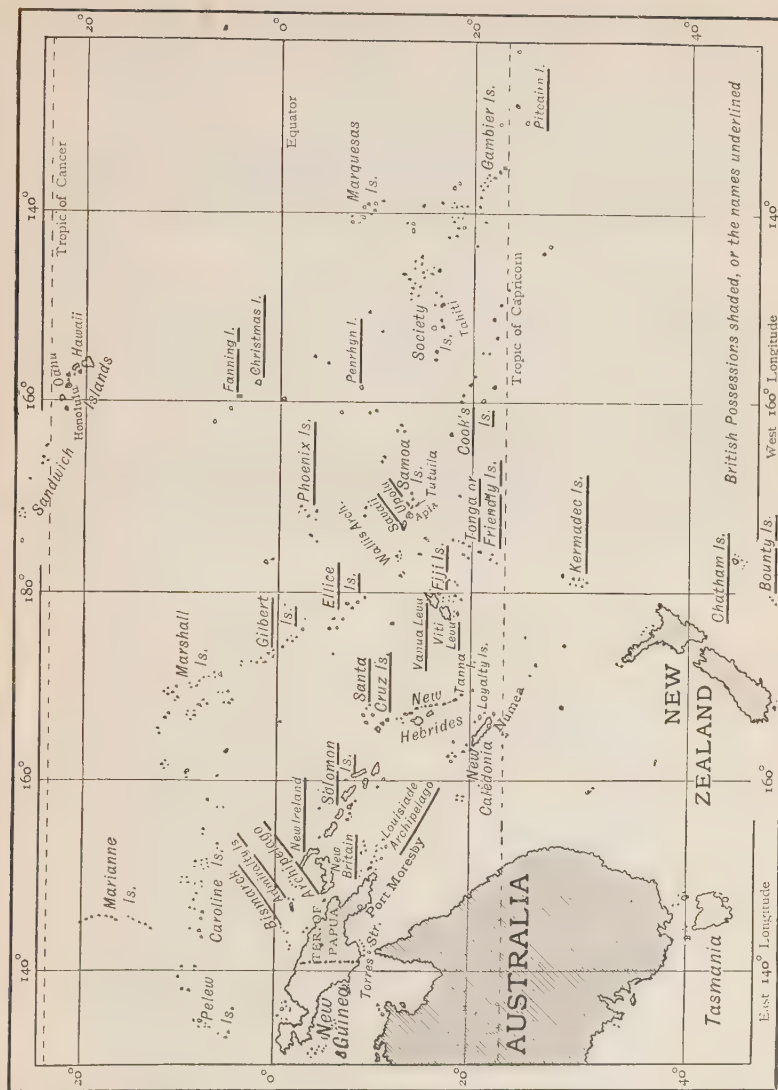
The chief islands are **Hawaii** and **Maui**.

Surface.—The islands are mountainous, and the seat of much volcanic energy. **Kilauea** is a most remarkable active volcano, with a vast crater filled with boiling lava.

Mauna Loa and **Mauna Kea** are peaks nearly 14,000 ft. in height, and the latter is an extinct volcano. The climate is tropical but tempered by the ocean, and the soil fertile.

Products.—**Sugar** the chief, rice, coffee, bananas, hides, and wool. The trade is almost entirely with the United States, which receive a vast quantity of sugar and return manufactured goods.

FIG. 277.—ISLANDS OF THE PACIFIC.



Longmans & Co. London, New York, Calcutta, Bombay & Madras.

Emery Walker Ltd., SC.

The natives are much like the Maoris in appearance and character, and are fast diminishing, while European residents are increasing. There are also Japanese, Chinese, and Portuguese immigrants, the latter from the Azores.

GOVERNMENT.—Formerly a constitutional monarchy with two Houses, the House of Nobles and the House of Representatives, but (1895) the sovereign, Queen Liliuokalani, was dethroned, and the government became Republican. The islands now form a territory of the United States.

The capital is **Honolulu**, on Oahu Island, a town with 52,000 inhabitants, with telegraphs, telephones, and railways.

SAMOA, or Navigators' Islands, is a group of 14 islands with an area of 1,700 sq. miles, and population of 36,000. The Islands of **Upolu** and **Savaii** belonged to Germany. They are now held by New Zealand. **Tutuila** belongs to the United States.

The capital is **Apia**, upon Upolu. The exports are copra, cotton, and coffee.

TONGA, or Friendly Islands, are a small group to the south-west of Fiji, and are under the protectorate of Great Britain. Copra is the chief export, and drapery the chief import.

EASTER ISLAND, the extreme south-western island of Polynesia, is remarkable for the carved stones and images found there.

EXAMINATION PAPERS

- A. 1. State the great divisions of the Pacific Islands, and name the chief groups and islands in each.
2. Write a description of New Guinea, drawing a sketch-map to show all names mentioned in answer.
3. State the chief products of Polynesia, indicate which of these are exported, name the chief imports and the countries with which trade is carried on.
4. Where and what are Suva, Numea, Port Moresby, Papeete, Honolulu, and Apia?
- B. 1. Describe the Fiji Islands, showing position, size, climate, products, character, and races of inhabitants.
2. State some facts of interest respecting the New Hebrides, New Caledonia, Pitcairn Island, Easter Island, and Marquesas Islands.
3. State the chief islands under European control, and show how and by whom they are governed; also in what peculiar ways they may be of importance.
4. Give some account of the independent islands of Polynesia.

PRONUNCIATION OF GEOGRAPHICAL NAMES



PLACE-NAMES in which the pronunciation generally corresponds with the spelling are omitted from this list. In many foreign words it is only possible to give an approximate pronunciation, as many of the sounds are not familiar to English ears. The following signs are used in the pronunciation : *o* represents the sound of *th*, as in *this* ; *x* represents a guttural sound, similar to *h* when strongly aspirated, as in the German *ch* and in the Scotch word *loch* ; *n* is used in Spanish words to represent a similar sound ; *ɲ* represents the semi-nasal sound in French somewhat approaching the sound of *ng* in English ; *ñ* is sounded like *ni* in pinion ; *g* is sounded as in *get*. For the key to the vowel sounds see the foot of each page.

Aachen, *ä'ken*
 Aarhuus, *ör'hoos*
 Aberystwith, *ab-er-ist'with*
 Aboukir, *ä-boo'kēr*
 Abruzzi, *ä-broot'tsi*
 Acapulco, *ä-kä-pool'kō*
 Achill, *ak'il*
 Aconcagua, *ä-kon-kä'gwä*
 Adamawa, *ad-a-mä'wa*
 Adige, *ä'dē-jä*
 Adirondacks, *ad-i-ron'daks*
 Alicante, *ä-lē-kän'te*
 Allier, *äl-lē-ä*
 Alnwick, *an'ik*
 Amiens, *ä-mē-an*
 Anahuac, *ä-nä-wäk*
 Angers, *on-zhā*
 Angra Pequena, *ang-gra pū-kä'nya*
 Anjou, *on-zhoo*
 Antananarivo, *än-ta-na-na-rē'vō*
 Antigua, *an-tē'gä*
 Antilles, *än-till'lēz* or *on'tēl*
 Appalachian, *ap-pa-lä'chē-an*
 Ardennes, *är-dēn*
 Armagh, *är-rä*
 Arras, *är-rä*
 Ashby-de-la-Zouch, *zooch*

Assiniboine, *as-sin'i-boin*
 Assuan, *äs-soo-än*
 Atacama, *ä-tä-kä'mä*
 Aube, *ōb*
 Aullagas, *oul-yä'gäs*
 Auvergne, *ō-ver'ñ*
 Avignon, *ä-vē-nyōn*
 Badajoz, *bä-da-hōs*
 Baden, *bä'den*
 Bahr-el-Ghazal, *bär-el-gazal*
 Balkh, *bälk*
 Bechuana, *betch-oo-ä'na*
 Beira, *bä'ē-ra*
 Beirut, *bä'root*
 Benares, *be-nä'res*
 Ben Cruachan, *kroo'ak-an*
 Ben Macdhuil, *mac-doo'ē*
 Benguela, *ben-gä'lä*
 Besançon, *bä-zon-sōn*
 Biarritz, *bē-är-rēts*
 Bideford, *bid'e-ford*
 Blanc, Mont, *mōn blon*
 Bloemfontein, *bloom'fon-tēn*
 Boisé City, *boi'ze*
 Bologna, *bō-lō'nyä*
 Bougie, *boo-zhē*

bat, bäte, bär, bäll ; met, mē ; win, wine ; dot. dōte ; tun, tūne.

Boulogne, *boo-lōn* or *boo-lo'ñ*
 Bracciano, *brät-chä'nō*
 Brienz, *brē'ents*
 Bruges, *brützh*
 Buenos Ayres, *boo-e'nōs i' res*
 Butte City, *but*

Caen, *kōn*
 Cagliari, *käl'yä-rē*
 Caicos, *kī'kōs*
 Calais, *kal'is* or *kä-lä*
 Campagna, *käm-pä'nyä*
 Cannes, *kän*
 Catoche, *kä-tō'che*
 Cayenne, *ki-en*
 Cenis, *se-nē*
 Cephalonia, *sef-ä-lo'nē-ä*
 Cetinje, *set-tēn'yä*
 Cette, *set*
 Cevennes, *sä-ven*
 Chamouni, *shä'moo-nē*
 Champlain, *shäm-plän*
 Chapala, *chä-pä'lä*
 Charleroi, *shärl-rwä*
 Chaux de Fonds, *shō de fōn*
 Chelyuskin, *chel-yus'kin*
 Chemnitz, *käm-nits*
 Cher, *shär*
 Chicago, *she-ka'gō*
 Chiloe, *chē-lō-e*
 Chillan, *shē-yōn* or *chil-lon*
 Chimborazo, *chim-bō-rä'sō*
 Chobe, *chō'bä*
 Chonos, *chō'nōs*
 Cincinnati, *sin-sin-nä'ti*
 Ciudad Rodrigo, *thē-oo-dä-d rod-rē'gō*
 Clwyd, *klwid*
 Cochabamba, *kō-chä-bäm'bä*
 Coele Syria, *sē'lē*
 Coimbra, *kō-ēm'brä*
 Colorado, *kol-ō-rä'dō*
 Coomassie, *koo-mas'si*
 Coquimbo, *kō-kēm'bō*
 Corrientes, *kōr-rē-en'tes*
 Cottian Alps, *ko'ti-an*
 Creuzot, *kreu-zō*
 Curaçoa, *koo-rä-so'ä*
 Czernowitz, *chär-nō'vêts*

Danzig, *dänt-sig*
 Darjiling, *där-jē'ling*
 Debreczin, *dä'bre-tsen*

D'Entrecasteaux, *don-tr-käs-tō*
 Despoto Dag, *des-pō'tō-däg*
 Dhwalagiri, *dä-wa-lä-gē'rē*
 Dieppe, *dē-ep*
 Dijon, *dē-zhōn*
 Dobrudsha, *dō-brood'shä*
 Dominica, *dom-i-nē'kä*
 Dordogne, *dör-dōñ*
 Dordrecht, *dör'drext*
 Dovre Fjeld, *dō'vre fyel* or *fi-eld*
 Durazzo, *doo-rät'sō*
 Dzungaria, *dzoon-gä-ri-a*

Echuca, *e-choo'ka*
 Ecuador, *e-kwä-dör*
 Eigg, *ēg*
 Ehrenbreitstein, *ä-ren-brit'stin*
 Ekaterinodar, *yä-kä-tü-rēn'ō-där*
 Elgin, *el'gin*
 El Obeid, *el-o-bä'id*
 Enschede, *en-skä'de*
 Epernay, *ä-per-nä*
 Epinal, *ä-pē-näl*
 Ericht, *er'ikt*
 Erzgebirge, *erts-ge-bēr'ge*
 Esquimault, *es-kē-malt*
 Essequibo, *es-se-kē'bo*

Fermanagh, *fer-man'a*
 Fichtel Gebirge, *fē'el-ge-bēr'ge*
 Fiji, *fē'jē*
 Finisterre, *fen'es'tär*
 Fiume, *fē-oo'mä*
 Fourmies, *foor'mē*
 Foveaux, *fō'vō*
 Frisches Haff, *frē'shā-häf*
 Fuji-yama, *foo-zē-yä'mä*

Gardafui, *gwär'da-fwē*
 Gaucho, *gou'cho*
 Gefle, *yä'flä*
 Ghent, *gent*
 Gironde, *zhē-rōnd*
 Gizeh, *gē'ze*
 Godávári, *gō-dä-va-ri*
 Graaf Reinet, *gräf-ri'net*
 Gris Nez, *grē-nä*
 Grisons, *grē-zōn*
 Gruyère, *gru-yär*
 Guadalaviar, *gwä-dä-lä-vē-är*
 Guadalquivir, *gwä-däl-kē-vēr*

bat, bäte; bär, bäll; met, mē; win, wine; dot, dōte; tun, tūne.

Guadaloupe, Sierra, *gwä-dä-loop-a*
(*Sp.*)

Guadaloupe, *gä-da-loop* (*W. Indies*)

Guadiana, *gwä-dē-ä'nä*

Guaira, *gwä'ē-rä*

Guanape, *gwan-yä'pā*

Guatemala, *gwä-te-mä'lä*

Guayaquil, *gwä-ä-kēl*

Guiana, *gē-ä'nä*

Gwydir, *gwä'dir*

Hakodate, *hä-kō-dä'te*

Hankau, *hän-kow*

Hanoi, *hä-nō'e*

Hardanger, *här'däng-er*

Harz, *härts*

Havre, *häv'r*

Herzegovina, *herts-e-gō-vē'na*

High Wycombe, *wi'kom*

Hodeida, *hō-dä'ē-dä*

Hokitika, *hō-kī-tē'ka*

Huē, *hoo-ä*

Huelva, *hoo-el'vä*

Hyères, *ē-är*

Ijssel, *is'sel*

Illinois, *il-li-nois* or *il-li-noi*

Iquique, *ē-kē'ka*

Iroquois, *i-rō-kwoi*

Jahde, *yäh'de*

Jassy, *yäs'sē*

Jerez, *hā-reth*

Jorullo, *hō-rool'yō*

Jostedalsbrae, *yōs'te-dälz-brū*

Jucar, *hoo-kär*

Jungfrau, *yong'frou*

Kaisarieh, *kī-sä-rē'e*

Kamchatka, *kam-chat'ka*

Karachi, *ka-rä'chē*

Keighley, *kēth'li*

Khargeh, *kär'ge*

Kiakhta, *kē-äx'tä*

Kilauea, *kī-lou-ä'a*

Kilimanjaro, *kil'e-män'jä-rō*

Kirkcudbright, *ker-koo'bri*

Kishinef, *kē-she-nyef*

Kissingen, *kēs'ing-en*

Kiushiu, *kē-oo'sē-ō*

Kosciusko, *kos-i-us'kō*

Kuen-lun, *kwen-loon*

Lachine, *la-shēn*

La Guayra, *la gwä'e-rä*

Landes, *lond*

Langres, *longr*

Latakieh, *lä-tä-kē'ä*

Launceston, *läns'ton*

Lausanne, *lō-zän*

Leeuwin, *lä'oo-win* or *lä-win*

Legnano, *lä-nyä'nō*

Liège, *lē-äzh*

Ligny, *lē-nyē*

Lille, *läl*

Limoges, *lē-mōzh*

Linnhe, *lin'nä*

Linz, *lēnts*

Lippe, *lip'pe*

Llanelly, *lä-nel'li*

Llano Estacado, *lyä'nō es-tä-kä'dō*

Loch, *lox*

Loire, *lwär*

Lorient, *lō-rē-on*

Los Angeles, *los ang'hel-es*

Lough Neagh, *lox nā*

Louisiade, *loo-ē-zē-äd*

Louisville, *loo'is-vil* (*U.S.*)

Maastricht, *mäs'trekt*

Maggiore, *mä-jō'rä*

Mahmudieh, *mä-moo-dē'e*

Maimachin, *mī-mä-chēn*

Malaga, *mä-lä-gä*

Malines, *mä-lēn*

Maranhao, *mä-rän-yä'o*

Marseilles, *mär-sälz*

Martigny, *mär-tē-nyē*

Martinique, *mär-tē-nēk*

Massachusetts, *mas-sa-choo'sets*

Massaua, *mäs-sou'a*

Mekinez, *mä'ki-nez*

Menderes, *mēn'de-res*

Mentone, *mēn-to'nä*

Mer de Glace, *mär de gläs*

Michigan, *mish'i-gan*

Miquelon, *mik'e-lon*

Mitylene, *mī-ti-lē'nē*

Mobile, *mō-bēl*

Monaghan, *mon'a-han*

Mons, *mons*

Mossamedes, *mos-sä-mä'des*

Mozambique, *mō-zam-bēk*

Mulahaen, *mool-ä-then*

Munich, *mü-nik*

Murghab, *moor-gāb*
 Murrumbidgee, *mur'rum-bid'jē*
 Mweelrea, *mwēl-rā*

Nagasaki, *nā-gā-sā'kē*
 Nanaimo, *na-ni'mō*
 Nantes, *noŋt*
 Negrais, *nē-gris*
 Neuchatel, *nu-shā-tel*
 Neusiedler, *noi-zēd'ler*
 Ngami, *ngā'mē*
 Nicaragua, *nē-kā-rā'gwā*
 Nice, *nēs*
 Nieuwveld, *nyūw-velt*
 Niigata, *nē-ē-gā'tā*
 Nijmegen, *ni'mā-gen*
 Nijni Novgorod, *nizh-ni nov'gō-rod*
 Nikolaievsk, *nē-kō-lā'ifsk*
 Nyanza, *nyān'zā*

Odense, *ō'den-sā*
 Ohio, *ō-hi'ō*
 Oich, *oix*
 Oise, *wāz*
 Okhotsk, *ō-kotsk*
 Omagh, *ō'mā*
 Orizaba, *ō-rē-sā'vā*
 Overijssel, *ō-ver-is'sel*

Pamir, *pā-mēr*
 Panama, *pā-nā-mā*
 Paranahyba, *pā-rā-nā-ē'bā*
 Parimè, *pā-rē'mā*
 Pauillac, *pō-ē-lyāk*
 Peipus, *pā-ē-pus*
 Pennsylvania, *pen-sil-vā'ni-a*
 Peshawur, *pe-shā'wer*
 Platte, *plat*
 Pnom-penh, *p'nom-pen*
 Point de Galle, *point-de-gal*
 Poitiers, *pwā-tē-ā*
 Pompeii, *pom-pē-yi* or *pūm-pā-ē-ē*
 Popocatepetl, *pō-pō-kā-te-petl*
 Port Alegre, *por-tā-lā-grā*
 Port au Prince, *port-o-prins*
 Potomac, *pō-tō-mak*
 Pribylov, *prē-be-lov*
 Puebla, *pwēb-lā*
 Puget, *pū-jet*

Quathlamba, *kwāt-lam'ba*
 Quatre Bras, *kā'tr brā*

Quilimane, *kēl-lē-mā'nā*
 Quito, *kē'tō*

Rájputana, *rāj-poo-tā'nā*
 Ramillies, *rā-mē-lyē*
 Rawal Pindi, *rā'wil pin'di*
 Recife, *rā-sē'fā*
 Reichenberg, *ri'ken-berg*
 Reichstag, *riks-tāg*
 Reikjavik, *ri'kyā-vik*
 Reuss, *rois*
 Riadh, *rē'ād*
 Richelieu, *rē'she-loo (Can.)*
 Rigi, *rē'gē*
 Rio Grande del Norte, *rē'o grān'da del nōr'ta*
 Rio Janeiro, *rē'o zhā-nā'e-rō*
 Roggeveld, *rog'ge-velt*
 Roraima, *rō-rā'ē'mā*
 Roubaix, *roo-bā*
 Rouen, *roo-on*
 Ruabon, *ru-ā'bon*
 Ruahine, *roo-ā-he'nā*
 Ruapehu, *ru-ā-pā-hō*
 Rügen, *rū'gen*
 St. Croix, *sant krwā*
 St. Etienne, *sān-tā-tē-en*
 Sakhalin, *sā-kā-lēn*
 Samothrace, *sā-mō-thrā'kē*
 Samoyedes, *sam-oi-edz*
 Santiago, *sān-tē-ā'gō*
 Saône, *sōn*
 Saskatchewan, *sas-kach'e-won*
 Sawakin, *sa-wā'kēn*
 Schaffhausen, *shāf'houz-en*
 Scheldt, *skelt*
 Schiedam, *skē'dam*
 Schiehallion, *shē-hal'yun*
 Schneekoppe, *shnā'kōp-pe*
 Schouwen, *skou'ven*
 Seine, *sān*
 Serajevo, *se-ri-yā'vō*
 Seychelles, *sā-shel*
 Sierra, *sē-er'rā*
 Siwah, *sē'wa*
 Sogne Fjord, *sō-ġ'nā fyōr*
 Somali, *sō-mā'lē*
 Spezzia, *spāt-sē-ā*
 Squillace, *skwēl-lā'chā*
 Srinagur, *srē-nā-gār*
 Stanovoi, *stan'o-vō-e*
 Suchau, *soo-chow*

Sucre, *soo'kre*
 Surabaya, *soo-rä-bä'yä*
 Susquehanna, *sus-kwē-han'na*
 Swatau, *swä'tow*
 Szegedin, *seg'e-dēn*

Tamatave, *tä-mä-täv*
 Tanganyika, *tan-gan-yē'ka*
 Tapajos, *tä-pä'zhōs*
 Taupo, *tä-pō*
 Tegucigalpa, *te-goo-se-gäl'pä*
 Tehuantepec, *te-wän'te-pek*
 Temesvar, *tā-mesh-vär*
 Teté, *tä'tä*
 Tezcucó, *tes-koo'kō*
 Theiss, *tis*
 Tian-shan, *tē-an'shan*
 Ticino, *tē-chē'nō*
 Tientsin, *tī-en'tsēn*
 Tierra del Fuego, *tē-er'rä del fwā'gō*
 Titicaca, *tē-tē-kä'kä*
 Tongariro, *tong-ä-rē'rō*
 Trieste, *trē-est*
 Trondhjem, *trōn'yem*
 Tsaritsin, *tsä-rēt-sēn*

Ucayali, *oo-kä-yä'le*
 Uitenhage, *oi'ten-hä-ge*
 Urumia, *oo-roo-mē'yä*
 Ushant, *u-shon*
 Utrecht, *oo'trext*

Vaal, *väl*
 Valenciennes, *vä-lon-sē-ün*
 Valli di Comacchio, *kō-mäk'kē-ō*
 Vegesack, *vā'ge-zäk*
 Venezuela, *ve-ne-soo-e'la*
 Verkhoyansk, *ver-kō-yānsk*
 Vermejo, *ver-me'nō*
 Versailles, *ver-sälz* or *vär-sä'ye*
 Verviers, *vär-vē-ä*
 Vienne, *vē-en*
 Vladikavkaz, *vlä-dē-kav-kaz*
 Vlieland, *vlē'lant*
 Vorarlberg, *för-ärl'berg*
 Vosges, *vōzh*

Wadai, *wä-di*
 Waikato, *wä-ē-kä'tō*
 Wakatipu, *wä-kä-tē'pō*
 Wieliczka, *vē-lēch'kä*

Yablonoi, *yäb-lō-nō'ē*
 Yapura, *yä-poo-rä*
 Yenisei, *ye-nē-sä'ē*
 Yosemite, *yō-sem'i-te*
 Youghal, *yäl*

Zagazig, *zä-ga-zég*
 Zante, *zän'tä*
 Zurich, *tsü'rēk*
 Zuyder Zee, *zoi'der-zä*

bat, bâte, bär, ball; met, mē; win, wine; dot, dôte; tun, tüne.

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